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LANCASHIRE COUNTY COUNCIL

ANNUAL REPORT

of the

COUNTY ANALYST

for

THE YEAR 1966

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(1967)

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LANCASHIRE COUNTY LABORATORY

STAFF 1967

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MRS. M. SAUNDERS

LANCASHIRE COUNTY COUNCIL

ANNUAL REPORT OF THE COUNTY ANALYST FOR THE YEAR 1966

To the Chairman and Members of the Lancashire County Council.

I have the honour to submit for your consideration my twenty-first Annual Report which deals with the work carried out in the County Laboratory during the year ended 31st December, 1966. The total number of analyses and tests carried out in this period was 14,286. In order to facilitate reference these have been grouped under the following headings :—

Part I. Report on samples taken under the Food and Drugs Act, 1955. Page 11.

Part II. Report on Heat-treated Milk samples taken under the Milk (Special Designation) Regulations, 1963 as amended. Page 123.

Part III. Report on samples taken under the Fertilisers and Feeding Stuffs Act, 1926. Page 128.

Part IV. Report on Waters, Effluents, etc. Page 134.

Part V. Radioactivity. Page 140.

Part VI. Miscellaneous (including Atmospheric Pollution). Page 149.

The number of samples examined for the County under the Food and Drugs Act and the Fertilisers and Feeding Stuffs Act (excluding, however, milk samples submitted for Phosphatase, Methylene Blue or Turbidity Tests) was 8,298. The number of Food and Drugs samples submitted by the 13 Autonomous Food and Drugs Authorities, for which your Analyst acts as Public Analyst, was 2,410.

The number of Food and Drugs samples (excluding appeal-to-cow samples) submitted by the County Sampling Officers during the year 1966 was 8,190 as against 7,959 during the previous year and 7,766 in the year 1964 ; the rate of samples per 1,000 of the population was 5·50 in the year under review, 5·34 in 1965 and 5·41 in 1964.

The number of County Food and Drugs samples has, therefore, been maintained well above the level reached in 1947 (6,819). Prior to 1947, the highest figure was 5,263 in the year 1933. During the year 1966 the number of samples found to be adulterated or unsatisfactory was 436 ; this corresponds to an adulteration rate of 5·3 per cent., as against 6·4 per cent. in the year 1965, and 7·2 per cent., in the year 1964. Table 4 gives the percentage adulteration for the last 10 years and it will be seen that there has been an appreciable drop over that period compared with the years 1941 to 1948 when the adulteration rate varied from 9·3 to 5·7 per cent. Viewed in the light of the last mentioned figures the adulteration rate for the year 1966 cannot be regarded as unsatisfactory although it is higher than in the years immediately preceding the war when the percentage adulteration varied from 2·6 to 4·2. The higher adulteration rate during the last four years is mainly due to the testing of samples of milk and Channel Islands milk for the presence of antibiotics.

In view of the fact that it is the duty of the Food and Drugs Authority to enforce the provisions of Section 37 of the Food and Drugs Act, 1955, the County Sampling Officers submitted 1,646 samples of heat-treated milk for examination by the Phosphatase test, the Half-hour Methylene Blue test or by the Turbidity test as against 1,296 samples submitted in the previous year. Of these, six failed to pass the Phosphatase test and ten samples failed to pass the statutory Methylene Blue test. The corresponding figures for the year 1965, were six and five respectively. In addition 230 samples of untreated milk were submitted for examination by the Half-hour Methylene Blue test and of these fourteen failed to pass the test. One of the samples of untreated milk was submitted for examination by the Phosphatase Test and it proved to be untreated. All the 91 County Districts comprising the County Food and Drugs Area during 1966 are Specified Areas in which only designated milks may be sold.

Approximately fifty-five per cent. of the Food and Drugs samples submitted by the County Sampling Officers consisted of samples of milk. Of 4,403 milk samples, 207 were found to be adulterated which represents an adulteration rate of 4·7 per cent. The corresponding figure for the year 1965 was 6·6 per cent. and for the year 1964 it was 7·5 per cent.

The 207 unsatisfactory milk samples examined during the year included, in addition to milks deficient in fat or containing extraneous water, eighteen samples found to contain foreign matter and twenty-two samples found to contain small amounts of penicillin. Milk adulteration in the County of Lancaster has, in general, shown consistent and appreciable decreases since the year 1946 when it was 10·2 per cent. It is reasonable to assume that these decreases are in some measure due to the increased sampling which has occurred since that year.

The adulteration rate for samples other than milk was 6·0 per cent. which is 0·3 per cent. lower than that obtained in the year 1965 when the figure was 6·3 per cent. The adulteration rate for the last 10 years has varied from 3·8 to 7·4 per cent., the former figure in the years 1952 and 1953 and the latter in the year 1961. The commodities which showed a relatively high proportion of unsatisfactory samples, and therefore, contributed especially to the adulteration rate included sausages (particularly sausages containing permitted preservative without declaration), samples of bread and other foods containing extraneous matter or insects, and samples whose labels did not conform to the requirements of the Labelling of Food Order. An examination, however, of Table 21 and the sections of the report concerned with the commodities just mentioned will bring to light the fact that many of the samples reported as unsatisfactory showed only slight irregularities in composition or minor infringements of labelling requirements.

Seven new regulations relating to the work of the Public Analyst were made during the year under review and they are all discussed at the beginning of Part I of this report. They replace or amend existing regulations and two are perhaps of special interest. The Butter Regulations, 1966, will come into operation on the 1st September, 1967, and, in addition to the present requirement that butter shall contain not more than 16 per cent. water, will require butter to contain not less than 80 per cent. milk fat and not more than 2 per cent. milk solids other than fat. Special requirements are laid down for " salted butter " and for " unsalted butter." The Cheese (Amendment) Regulations, 1966, are of importance in that they add standards for some eight varieties of foreign cheese to the standards included in the principal regulations. Proposals for Regulations for Fish and Meat Spreadable Products were circulated for comment during the year and they will increase the meat content of meat paste from 55 per cent. to 70 per cent. and will define the conditions under which the words " spread " and " paste " may be used. Both a Report and Proposals for Regulations on Solvents were published during the year under review and they recommend that Regulations should provide for a list of nine permitted solvents each of which will be

required to satisfy a specification of purity. The expected Food Standards Committee Report on Claims and Misleading Descriptions was also published during the year 1966. This follows the Committee's Report on Food Labelling published in 1964 and completes the Committee's review of the Labelling of Food Order 1953. This is a most important report which makes some 46 recommendations, the scope of which are referred to briefly in Part I of this report.

In Part I of the report will also be found information with regard to the presumptive standards of quality for milk, the special standard for the milk fat content of Channel Islands milk, the proportions of the various special designation milks which were found to be adulterated, the proportion of milks which were found to be naturally poor in solids-not-fat, etc. Although the proportion of Channel Islands milk samples to samples of ordinary milk obtained in Lancashire is low compared with this proportion in counties in the South of England, nevertheless, the number of Channel Islands milk samples submitted to the County Laboratory is slowly increasing. During the year under review the number examined was 585 (497 County) and it is interesting to compare the averages for fat and solids-not-fat of the Channel Islands milk samples with those for ordinary milk samples. Channel Islands milks showed an average of 4·81 per cent. milk fat and 9·06 per cent. solids-not-fat whereas the averages for ordinary milks were 3·70 per cent. for milk fat and 8·63 per cent. for solids-not-fat.

During the year 55 samples (36 County) were found to contravene the requirements of the Labelling of Food Order. Similar figures were obtained in the year 1965 when 53 samples (28 County) were unsatisfactory in relation to their labels. The majority of the unsatisfactory samples during the year under review, as will be seen from the details given in table 21, were due to a failure to comply fully with the requirements of the order but a number of the more interesting samples are described in the section of the report which deals with the order. Objection was taken to two samples of Eccles cakes claimed to be made with pure butter but it was found that only approximately two-thirds of the added fat consisted of butter. Objection was also taken to buttercake biscuits which only contained a similar proportion of butter and to a dairy almond cake made with skimmed milk powder. Glucose sweets were sold with claims that they were a pure glucose product and that the glucose was a source of energy, although, in fact, they contained more than twice as much ordinary sugar and the " glucose " was only glucose syrup solids. Successful legal proceedings were instituted in respect of a sample of pickles which was not labelled that it contained preservative and the amount of preservative present was found to be excessive.

Potato crisps were found to be labelled with an unjustifiable claim that they were starch reduced. Two successful prosecutions were instituted in respect of a can of cat food and a can of dog food, sold by different shops, to each of which had been attached labels implying that the cans contained baked beans in tomato sauce, three samples of food colouring matters of different origin were found to be labelled in a manner which did not comply with the requirements of the Colouring Matter in Food Regulations and the Labelling of Food Order and the packers of each were communicated with by the Autonomous Food and Drugs Authorities concerned.

The average composition of ice-cream, as will be seen from table 22, has been maintained at a satisfactory level but, of the 138 samples examined, nine (six County) were reported upon adversely. Six of these were deficient in fat or milk solids other than fat, one contained saccharin, and two, traces of tinned iron particles. Seventeen samples of dairy ice-cream were also examined and of these one County sample was slightly deficient in milk fat. Dairy ice-cream should contain not less than five per cent. milk fat and no other type of fat.

A total of 138 samples submitted during the year 1966 mainly as the result of complaints by members of the public were found to contain either extraneous matter or insects. Ninety-nine of these samples consisted of County samples. The corresponding figure for the year 1965 was 139 (105 County). There has, therefore, been practically no decrease in such samples, a number of which resulted in successful prosecutions. Details of these will be found in Part VI and the sections of the report dealing with extraneous matter and insects. Probably the most interesting were bread containing boric acid lint, " lemonade " which consisted of caustic soda solution, a sliced loaf containing a cigarette filter tip, bread a week old infested with mould, bread containing a nail, milk containing a potato crisp bag, biscuits and potato crisps both badly infested with Australian spider beetles, fried chipped potatoes and a meat and potato pie each containing a cockroach, and rodent excrement found on a steak pie.

During the year under review 4,909 County samples of milk were tested for the presence of antibiotics. This number included 2,647 samples of untreated milk and 2,262 of heat treated milk. Twenty-eight samples (0·6 per cent.) gave positive results all of which were due to the presence of penicillin. The highest amount of penicillin found in a sample of untreated milk was 2·5 units per ml. while the highest amount in heat treated milk was 0·08 unit per ml. There has, therefore, been a distinct improvement compared with the year 1965 when of a similar

number of milk samples 1·6 per cent. were found to contain antibiotics. Successful legal proceedings were instituted during the year 1966 in respect of seven of the samples of milk found to contain penicillin.

Prosecutions were instituted in respect of 44 County samples during the year under review. Thirty of these related to samples of milk which were deficient in fat or contained extraneous water, penicillin or foreign matter. As regards other types of samples which were the subject of prosecutions, four samples of bread contained foreign matter, another loaf and a fruit tart were each infested with mould, three samples contained insects, two samples were pet foods incorrectly labelled, a sample of pickles contained excess preservative, one of " lemonade " was found to consist of caustic soda solution and a sweet contained iron wire. It will be seen from table 24 that the total fines and costs obtained during the year 1966 is the highest since the year 1946.

The County Laboratory is taking part in a national survey to ascertain the level of insecticides, particularly chlorinated pesticides, in foods, organised by the County Councils Association in conjunction with the Association of Municipal Corporations and the Urban District Councils Association. Work started on this in August of the year under review and, during the remainder of the year, 65 samples were submitted under the scheme but this represents only a fraction of the total number of samples examined in the laboratory for the presence of insecticides, fungicides, etc. A section of the report deals with this work and describes the techniques used. A table has also been included which gives the number of samples of each commodity found to contain organochlorine pesticide residues and the amounts present. Although a considerable proportion of the samples examined contained small amounts of chlorinated residues, in no instance was the amount such that an adverse report had to be issued.

During the year under review 590 samples of drugs were submitted of which 508 were received from County Sampling Officers. Some 244 of the samples (207 County) consisted of modern official or proprietary drugs of which nine were reported upon adversely. In all, 21 of the samples (19 County) were found to be unsatisfactory. Among the more interesting of the samples were two samples of junior aspirin tablets which both contained excessive amounts of free salicylic acid, two samples of cough syrups which contained small amounts of quillaia and formaldehyde respectively, a sample of gelatine which contained a few small particles of tinned iron, two samples of a proprietary sulphonamide suspension which were deficient in their total sulphonamide

content, probably due to insufficient mixing when dispensing, and another proprietary sulphonamide suspension and a proprietary cough linctus for which other preparations had been dispensed by mistake.

The work on radioactivity was continued and is described in Part V of the Report. Ninety-five samples were examined including air, rain-water, tap-water, school dinners, milk and other foods, primarily in order to obtain further information on fallout and the level of strontium 90 in a mixed diet. We are still receiving fallout from the intensive series of Russian and American nuclear tests carried out in the years 1961 and 1962, and there were also three test explosions in China and several French tests in the Southern Hemisphere during the year under review. The Chinese and French tests together, however, probably contributed less than two per cent. of the total strontium 90 deposited during 1966. Fallout has steadily decreased in amount since 1963 and it is gratifying to be able to report that the amounts of strontium 90 in air and rainwater samples in the year under review were only approximately two-fifths of those found in the year 1965 which, in turn, were only one-half or less of the amounts found in the year 1964. The amounts of strontium 90 in tapwater and milk have also decreased but not quite so markedly, the levels having dropped by approximately 30 per cent. in each of the last two years. This slower rate of decrease is due to the effects of the accumulated strontium 90 already on the ground from previous fallout.

During the years that I have had the honour to be your Analyst, scientific knowledge, particularly in the realms of chemistry and physics, has increased at an unprecedented rate with the result that many new techniques have been made available and analytical determinations, which were formerly impossible to carry out, are now regarded as almost routine. The first break away from traditional volumetric and gravimetric analysis came with the introduction of the freezing point method for the determination of extraneous water in milk. This technique was investigated and developed over a number of years by my predecessors Dr. G. D. Elsdon and Mr. J. R. Stubbs. In the year 1946 apparatus for spectroscopic, absorptiometric and fluorimetric determinations were acquired by the County Laboratory. Later, microbiological methods of assay for vitamins and antibiotics were adopted. Chromatography was being developed about this time and four chromatographic techniques have successively been introduced into the laboratory, viz :— liquid-column, paper, gas-liquid and thin-layer. Following the Windscale incident in October 1957 your Committee authorised the purchase of apparatus for radiochemical determinations and this has since been in continuous use checking the level of radio-

active isotopes in foods, etc. It should, however, be stressed that the above should not be regarded as a complete list of what is possible and there are still a number of other modern forms of equipment which if obtained could further increase the efficiency of the laboratory: for example, apparatus for mass spectroscopy, infra-red absorption, atomic absorption, electrophoresis and ultra-violet self recording spectrophotometry.

The development of the above-mentioned diverse techniques has made it possible to investigate the nature and amounts present of vitamins, antibiotics, antioxidants, insecticides, fungicides, colouring matters and constituents of modern drugs; formerly it was extremely difficult if not impossible to undertake work of this kind. A further result is that the Government is now able to lay down analytically enforceable standards for many constituents of foods and for chemical additives in foods; this is rendered evident by the steady year by year increase in the number of Statutory Regulations. This in turn means that the amount of work necessary on every type of sample has vastly increased and much of this additional work can be successfully carried out only by analysts with very specialised knowledge and training. So much is this so that over the last twenty years the total analytical and clerical staff of the County Laboratory has increased from nine to 24 and of the latter number 14 are qualified analysts.

During my tenure of office I have been particularly fortunate in having almost without exception as members of the County Laboratory staff colleagues on whose conscientiousness, loyalty and analytical skill I could rely without question. It is to them that I owe much of the success in carrying out the work described in this and previous reports. The amount of clerical work involved in keeping accurate records and compiling analytical and quarterly reports for the County Council and for a relatively large number of Autonomous Authorities, is in itself indicative of the efficiency of my Chief Clerk and his assistants, whose work has increased steadily with the growth of the laboratory. I owe a particular debt of gratitude to the Deputy County Analyst, Mr. A. C. Bushnell, and to the Senior Assistant Analysts for their help in co-ordinating the work of the laboratory and assisting in the drafting of annual and other reports. I would also like to express my appreciation of the very willing co-operation I have always received from the Sampling Officers of the County and of the Autonomous Food and Drugs Authorities without which it would not have been possible to maintain the smooth running of the work of the laboratory.

It has been a very great pleasure to me to serve the County Council, particularly in that I have been able to carry out my duties in a well equipped laboratory and I have never been denied permission to obtain special apparatus that I have considered necessary to carry out my work effectively. In conclusion, therefore, I wish to tender to the members of the County Council and to the County Medical Officer of Health my most grateful thanks for their unfailing interest in the work of the County Laboratory and for their continued encouragement and support throughout my tenure of office.

I have the honour to be, Mr. Chairman, Ladies and Gentlemen,

Your obedient Servant

GEO. H. WALKER,
County Analyst.

The County Laboratory,
County Hall,
PRESTON.
5th July, 1967.

Total Samples Examined

During the year 1966, a total of 14,286 analyses and tests have been carried out in the County Laboratory. They are classified in the following table :—

Table 1

County Samples—		
Food and Drugs Act (including 4,403 milks)		8,190
Appeal-to-Cow		58
Fertilisers and Feeding Stuffs Act, 1926		50
Food and Drugs Act samples (including one Appeal-to-Cow) from the following autonomous Food and Drugs Authorities—		
County Borough of Barrow-in-Furness	193	
Borough of Chorley	85	
Borough of Darwen	65	
Urban District of Huyton-with-Roby	215	
Urban District of Kirkby	246	
City of Lancaster	132	
Borough of Leigh	141	
Borough of Middleton	164	
Borough of Morecambe and Heysham	209	
Urban District of Newton-le-Willows	12	
County Borough of Preston	581	
County Borough of Southport	233	
County of Westmorland	134	
	——	2,410
Fertilisers and Feeding Stuffs Act, 1926—		
County Borough of Preston		31
County Borough of Southport		17
County of Westmorland		16
Other Samples (from all sources including the County)—		
Potable Waters		77
Other Waters and Effluents		49
Miscellaneous		247
Milk Samples.—Phosphatase Tests		1,265
Milk Samples.—Methylene Blue Tests		1,499
Milk Samples.—Turbidity Tests		377
Total number examined		14,286*

*Ninety Five of these samples were examined for radioactivity

The total number of samples analysed in the year is compared with the total numbers similarly classified for the previous years 1912-1965, in table 2. It will be seen from the table that, since the year 1912, the grand total of samples examined amounts to 418,978.

Table 2

Total number of Samples examined during the years 1912-1966.

Year	County Food and Drugs	Other Authorities Food and Drugs	County Appeal-to-cow Samples	Other Authorities Appeal-to-cow Samples	Fertilisers and Feeding Stuffs Act	Waters and Effluents	Miscellaneous and Departmental	Total Phosphatase, Methylene Blue and Turbidity Tests	Total
1912–1954	219147	12445	2571	130	1155	3122	4089	12294	254953
1955	8373	1983	49	5	76	118	288	2463	13355
1956	8215	2177	27	11	59	120	328	2508	13445
1957	8239	2007	77	2	80	121	387	2499	13412
1958	8225	2110	55	5	86	95	414	2445	13435
1959	8256	2394	18	3	87	129	445	2487	13819
1960	7857	2326	12	40	70	134	409	2610	13458
1961	8352	2270	21	36	78	158	449	3130	14494
1962	8784	2331	22	2	87	173	364	3083	14846
1963	8243	2017	12	14	86	187	353	2683	13595
1964	7766	2282	15	3	85	193	356	1959	12659
1965	7959	2339	19	4	80	145	355	2320	13221
1966	8190	2409	58	1	114	126	247	3141	14286
1912–1966	317606	39090	2956	256	2143	4821	8484	43622	418978

PART I.—SAMPLES TAKEN UNDER THE FOOD AND DRUGS ACT, 1955.

New Food and Drugs Legislation and Proposals for Regulations, etc., during 1966.

Seven new or amended Regulations which are of interest to Public Analysts were made during the year 1966. In addition, several Proposals for Regulations and Reports of the Food Standards Committee and of the Food Additives and Contaminants Committee were published by the Ministry of Agriculture, Fisheries and Food. The new Regulations were :—

The Salad Cream Regulations, 1966.

The Mineral Hydrocarbons in Food Regulations, 1966.

The Butter Regulations, 1966.

The Colouring Matter in Food Regulations, 1966.

The Skimmed Milk with Non-Milk Fat (Amendment) Regulations, 1966.

The Antioxidant in Food Regulations, 1966.

The Cheese (Amendment) Regulations, 1966.

Proposals for Regulations were circulated in regard to :—

Fish and Meat Spreadable Products.

Solvents in Food.

Amendments to the Cheese Regulations, 1965.

The Reports published were :—

The Food Standards Committee Report on Claims and Misleading Descriptions.

The Food Additives and Contaminants Committee Report on Solvents.

The Food Additives and Contaminants Committee Report on Cyclamates.

The Salad Cream Regulations 1966 came into operation on the 19th September, 1966, and re-enact with amendments the Food Standards (Salad Cream and Mayonnaise) Order 1945. They lay down the same standard of composition as in the previous order, viz : not less than 25 per cent. of edible vegetable oil and not less than 1·35 per cent. of egg yolk solids. The standard does not apply, however, to salad cream which bears a true description of its nature and in respect of which the word " salad," " cream " or " mayonnaise " is not included in any description appearing on the label. A detailed definition of " salad cream " is included in Regulation 2, but the new regulations do not include a statutory disclaimer to be printed on the labels of products which are not sold under the description salad cream or mayonnaise, as provided for under the previous food standards order.

The Mineral Hydrocarbons in Food Regulations 1966 came into operation on the 27th August, 1966, and they revoke and replace the Mineral Hydrocarbons in Food Regulations 1964. In the new regulations the specifications for purity no longer refer to " paraffin or microcrystalline wax " but to " solid mineral hydrocarbon." This change is due to the impossibility of making a microcrystalline wax which would comply with the specified absorption intensity figure and yet have certain other properties necessary for its use in chewing compounds. It was also found that the limit test for polycyclic hydrocarbons in the

1964 regulations was not sufficiently strict and would have permitted the use of impure paraffin wax. The 1966 regulations, therefore, include amended specifications for mineral hydrocarbons and a very detailed test for the absence of polycyclic hydrocarbons. A sample of 1,000 gms. of the solid mineral hydrocarbon must be used for the last mentioned test as against 100 gms. in the 1964 regulations ; it follows that the test is not only more stringent, but as it is on a larger sample it is, therefore, also more representative. The test obviously can only be carried out on solid mineral hydrocarbon obtained from a factory in which it is being used and it cannot be applied to the already manufactured chewing compound. The list of exemptions from the general prohibition on the use of mineral hydrocarbons in food is the same as the list given in the 1964 regulations except that it is made clear that in the case of whole pressed cheese mineral hydrocarbon is only permitted in the rind.

The Butter Regulations 1966 come into operation on the 1st September, 1967 and they replace the Food Standards (Butter and Margarine) Regulations 1955 in so far as butter is concerned. The new regulations include a definition of " butter " which includes " whey butter " and prescribe the following standards :—butter shall contain (*a*) not less than 80 per cent. milk fat, (*b*) not more than two per cent. milk solids other than fat and (*c*) not more than 16 per cent. water. " Salted butter," labelled as such, may contain not less than 78 per cent. milk fat if the amount by which the milk fat falls below 80 per cent. does not exceed the amount by which the percentage of salt present exceeds three per cent. The regulations also require that where butter does not contain any added salt any label or advertisement relating to it must be marked conspicuously with the words " unsalted butter."

The Colouring Matter in Food Regulations 1966 came into operation on the 26th June, 1967 and the Colouring Matter in Food Regulations 1957 will be revoked completely by the 1st January, 1968. The new Regulations follow, in general, the recommendations of the Food Standards Committee report published in 1964. Six of the previously permitted coal-tar colours are withdrawn and one colour (Black 7984) has been added. The colours withdrawn are :—Ponceau 3R, Ponceau SX, Naphthol Yellow S, Blue VRS, Yellow RFS and Yellow RY. There are now, therefore, 25 permitted coal-tar colours as against 30 formerly. Wherever possible standards of purity have been prescribed for permitted coal-tar, natural and other colours. In Regulation 5 are listed foods in which even added permitted colouring matter is prohibited or restricted. For example, raw meat, fish, vegetables, etc., may contain

no added colouring matter (except for marking) and butter may only contain carotene, annatto and turmeric. Labelling requirements are laid down for food colouring matters and food colouring compounds sold as such and the name of the colouring matter together with a correct description of the other ingredients of a compound must appear on the label.

The Skimmed Milk with Non-Milk Fat (Amendment) Regulations 1966 came into operation on the 22nd July, 1966. They amended the second schedule to the Skimmed Milk with Non-Milk Fat Regulations 1960 to permit the product S.M.A. both in liquid form as well as in powder form, and complying with the specifications laid down, to be sold without the declaration " unfit for babies".

The Antioxidant in Food Regulations, 1966, came into operation on the 9th December, 1966. They replace the Antioxidant in Food Regulations, 1958 but for a transitional period ending on the 8th September, 1967, compliance with either of the regulations will be permitted. The new regulations follow the Proposals for Revised Regulations on Antioxidants in Food which were circulated in September, 1965, and they implement the recommendations of the Food Standards Committee Report on Antioxidants, 1963, as amended by two supplementary reports of the Food Additives and Contaminants Committee published in May, 1965 and December, 1966. The two supplementary reports were mainly concerned with the possible toxicity of the permitted antioxidant butylated hydroxytoluene and that of diphenylamine which had been suggested for use on apples and pears. As a result of the recommendations made by the Committee butylated hydroxytoluene has been retained in the new regulations as a permitted antioxidant for use at the same levels as formerly (the Committee, however, recommended that its use be reviewed in two years time) but diphenylamine has not been included as a permitted antioxidant. Other important amendments are :—(*a*) the use of antioxidants in infant foods is prohibited ; (*b*) specifications of purity are laid down for all permitted antioxidants ; (*c*) ethoxyquin up to three parts per million is permitted in apples and pears ; (*d*) preparations containing more than 100,000 I.U.'s Vitamin A per gramme may contain certain antioxidants up to 10 parts per million per 1,000 I.U.'s Vitamin A per gramme and (*e*) partial glycerol esters may contain permitted antioxidants to specified limits.

Two proposals to amend the Cheese Regulations, 1965, were circulated during the year 1966. The first of these included a revised definition of " compound product " which excluded " Welsh rarebit " and certain other products from the definition. It also deferred certain labelling requirements until 1st February, 1970, although the regulations

themselves came into operation on 1st February, 1967. The second proposal was to include in the regulations standards for some eight varieties of foreign cheese including Edam, Gruyere and Emmental. This would implement the acceptance by the United Kingdom of standards prepared by the appropriate Committee of the Joint FAO/WHO Codex Alimentarius Commission. To implement the above the Cheese (Amendment) Regulations, 1966, were made on 28th December 1966, and became operative on 1st February, 1967. They gave effect to a revised definition of a " compound product " and added to the list of varieties of cheese specified in the principal regulations, the eight varieties of foreign cheese named in the proposals.

Turning now to other Proposals for Regulations circulated for comment during the year, the first related to Fish and Meat Spreadable Products. These are intended to replace the Food Standards Orders 1951 appertaining to these commodities and the proposals follow closely recommendations made in the Food Standards Committee Report on Food Labelling 1964 and the Report on Fish and Meat Pastes 1965. It is proposed that the word " spread " shall only be used in a description where the named meat or fish is present to at least 70 per cent. whereas the word " paste " may refer to products in which the varieties making up the 70 per cent. meat or fish content are not declared. From this it will be seen that the previous standard of 55 per cent. meat in meat paste has been increased to the figure of 70 per cent. previously only applying to the fish content of fish paste. The above distinction between " spread " and " paste " is new and quite arbitrary and until it has been in use some time may be no less confusing to the general public than the present nomenclature where " X paste " and " meat paste X " are used respectively to describe the two qualities of paste. The proposals also include standards for potted meat and fish, ' dressed crab," minced meat in jelly, brawn, and for certain of these products claimed to contain butter. With regard to meat paste it is proposed that the lean meat content shall not be less than 60 per cent. of the minimum total meat content required. Brawn is not usually regarded as a spreadable product yet it has been included in these proposals. Furthermore, the meat content proposed for brawn is not less than 60 per cent. which does not accord with the figure of not less than 80 per cent. given in the " Proposals for Sausages and other meat products " circulated in the year 1965. One further point is that the stated definition of " meat paste " includes pâté whereas the definition of " fish paste " omits pâté, although there are several varieties of fish pâté sold as such.

The Food Additives and Contaminants Committee's Report on Solvents was published in February 1966 and this was followed in November, 1966 by the circulation to interested parties of Proposals for Regulations on Solvents in Food. The proposals follow, in general, the recommendations of the Committee Report that there should be a permitted list of solvents rather than a prohibited list and that regulations should prescribe specifications of purity for the permitted food solvents. The Pharmacology Panel of the Committee considered 20 solvents which might be used and they recommended eight to be included in the permitted list ; these were :—ethyl alcohol, ethyl acetate, glycerol, glycerol mono-acetate, glycerol di-acetate, glycerol tri-acetate, iso-propyl alcohol and propylene glycol. The first six are regarded as acceptable for use in food. Iso-propyl alcohol and propylene gylcol are also regarded as provisionally acceptable but further information based on long term feeding tests should be obtained and their use should be reviewed in five years time. The eight recommended solvents mentioned above have been included in the permitted list in the Proposals for Regulations together with diethyl ether (solvent ether), making nine permitted solvents in all. Diethyl ether was not on the list considered by the Pharmacology Panel, but apart from its acute effects which gave rise to its use as a surgical anaesthetic it is regarded by the B.P.C. as having a wide margin of safety. The Proposals also include a definition of " solvent " which states that it means any liquid substance generally used to facilitate the incorporation of ingredients in food, but it excludes natural food substances and liquids primarily used as flavourings, propellents and certain other permitted food additives. Finally, it should be mentioned that the proposals include requirements as to the labelling of containers of food solvents.

The Food Standards Committee Report on Claims and Misleading Descriptions completes the Committee's review of the Labelling of Food Order 1953, as amended, and of food labelling and advertisements generally. It follows the Committee's Report on Food Labelling published in the year 1964 and the Proposals for Regulations on the Labelling of Food circulated for comment in September, 1965. The Report on Claims and Misleading Descriptions is very wide in its scope and makes some 27 recommendations with regard to claims and some 19 in regard to misleading descriptions. The general principles recommended are that :—(1) no claim should be made in respect of a food unless the value claimed is wholly contributed by the food and not partially by other foods with which it may be consumed ; (2) comparisons should not be on a false basis i.e., a low moisture food compared with one with a high moisture content, or food consumed in small quantities compared with one consumed in large quantities ; (3) claims of specific benefit to health must be justified on composition and the quantity normally

consumed in a day. Specific recommendations are made with regard to claims referring to caloric contribution, protein content, the nature of dietary fats, the presence of vitamins and minerals, slimming, diabetes, prevention of disease, restorative properties, tonic properties, etc. With regard to misleading descriptions recommendations are made as to the use of pictorial devices, the use of the words " natural," " pure," " home-made," " made of," " made from," " digestive," " dried," etc. Recommendations are also made with regard to claims of butter in flour confectionery and in sugar confectionery and the use of the word " cream " and related words such as " kreme," " kreem " and " creme." Restrictions are recommended on the use of the words " steak," " cutlet," " chop," " fillet," diminutives such as " steaklette " and " cutlette," the suffix "-burger " and the use of the word " fritter " in connection with a meat or poultry product. Recommendations are made as to the use of the descriptions " liqueur chocolate " and " shandy." Finally, it is recommended that the name " mustard and cress " should not be used if rape has been substituted for mustard.

The Report on Solvents has already been referred to in the paragraph dealing with the Proposals for Regulations on Solvents in Food. The remaining Report published during the year 1966 was the Food Additives and Contaminants Committee's Report on Cyclamates. The use of cyclamates as artificial sweeteners is permitted in soft drinks within prescribed limits by the Soft Drinks Regulations 1964, and the Proposals for Regulations on Artificial Sweeteners 1963 included cyclamates in the definition of " permitted artificial sweetener." Subsequent to the making of the Soft Drinks Regulations some doubt appears to have been raised as to the complete safety of cyclamates and the Food Additives and Contaminants Committee was asked to review all the evidence available. The Pharmacology Sub-Committee submitted a Report on the toxicological information (Appendix 1 of the Reports on Cyclamates) and concluded that there was an impressive amount of information (based on acute, short-term and metabolic studies) confirming the safety of cyclamates in the amounts likely to be used in foods. Although some long-term studies have been carried out the Sub-Committee feel that these should be extended and that this work should be completed within five years. The Food Additives and Contaminants Committee in the Report on Cyclamates accept the view of the Sub-Committee and affirm that there will be no risk to health in allowing the use of cyclamates in food subject to a review of any regulations being carried out in five years. The Committee, however, do not recommend any change in the ban on the use of artificial sweeteners in ice-cream.

A Press Notice was issued by the Ministry of Agriculture, Fisheries and Food in August, 1966 with regard to the Food Standards Committee's Report on Flavouring Agents published in 1965. In the Report the Committee had recommended that there should be a list of some 16 prohibited flavourings but that eventually regulations should be based on a list of permitted flavouring agents. The Press Notice draws attention, however, to the difficulties of exercising effective control by means of a short prohibited list and the Food Additives and Contaminants Committee has been asked to consider the matter again with a view to producing within five years recommendations for a permitted list of flavouring agents. This last Committee replaced the former Food Additives and Contaminants Sub-Committee of the Food Standards Committee, which was responsible for the 1965 Report on Flavouring Agents.

The second Addendum to the British Pharmacopoeia 1963 became official on the 1st September, 1966. This follows the 1964 Addendum and it has made it possible to introduce new monographs and amend existing monographs without waiting for the next edition of the British Pharmacopoeia. The 1966 Addendum contains 72 new monographs on drugs and preparations and contains amendments to 62 existing monographs, there are no deletions. Two new sulphonamides, sulphadimethoxine and sulphamethoxydiazine, have been added. There are monographs on three new radio-opaque substances and on two new antihistamines. Several new antibiotics have been included of which Phenethicillin Potassium may be mentioned. There has been an important change in the manner in which the potency requirements of antibiotics and their preparations, which are assayed biologically, should be expressed. This is based on more precise fiducial limits of error for assays, which will reduce the possibility of variation in the active content of antibiotic preparations. At the same time the statement of the required minimum potency has been amended to include the upper fiducial limit of error.

A Supplement to the British Pharmaceutical Codex 1963 came into force on the 1st August, 1966, i.e. before the B.P. Addendum 1966. The B.P.C. Supplement amends, where necessary, monographs in the 1963 Codex and gives additional information on the new substances which were included in the B.P. Addendum 1964. It also includes new formulae for eye-drops, linctuses and other preparations in the British National Formulary 1966 which came into effect about the same time. An important change has been made in the formulation of elixirs and linctuses. In the 1963 Codex new preparations of these types were formulated in the metric system and a suitable dose was contained in

5 mls, but other preparations retained from the previous codex were still formulated in the Imperial system, a suitable dose of these being contained in 60 minims (approximately 4 mls.). This anomaly has been removed and all elixirs and linctuses have been reformulated to contain a suitable dose in 5 mls. This means, of course, that the concentration of active ingredients in the preparations which have been reformulated is lower than previously. Important changes have also been made in connection with liquid eye preparations in order to avoid the dangers of using infected eye-drops and their sterility at the time they are dispensed is regarded as of over-riding importance. Complete new formulations have also been included in the Supplement for all those eye-drops which were previously preserved by hydroxybenzoates. Another point of importance is that a monograph has been included for concentrated raspberry juice and the monograph on syrup of raspberry has been amended to enable it to be freshly made from the concentrated juice. Maximum limits of 4,700 and 420 parts per million respectively of sulphur dioxide preservative are given in these monographs ; amounts which would contravene the Preservative in Food Regulations if they were used for purposes other than the flavouring of pharmaceutical preparations. Finally, a direct titration procedure has been adopted for the determination of codeine phosphate in liquid preparations in place of the more tedious chloroform—extraction method.

Particulars of Samples of Food and Drugs submitted by County Sampling Officers.

In table 3 there is a list of all the articles of food and drugs which were submitted during the year 1966 from the County of Lancaster together with the number of each and also the number found to be adulterated.

Table 3

Samples examined under the Food and Drugs Act during 1966

Samples	Number examined				Number adulterated or otherwise giving rise to irregularity			
	Formal	Informal	Private	Total	Formal	Informal	Private	Total
Almonds, Ground		11	1	12				
Angelica		1		1				
Arrowroot		10	4	14			1	1
Aspirin Tablets		28		28		2		2
Baby Foods		9		9		1		1
Backache Pills		1		1				
Bacon		12	3	15				
Bacon Grill, Canned ...		2		2				
Baked Beans, preparations, canned		6		6		2		2
Baking Powder		23	3	26		2		2
Barley		24	3	27				
Beer and Stout		10		10		2		2
Biscuits		26		26		3		3
Black Puddings		1		1		1		1
Blancmange Powder ...		24	2	26		1		1
Borax		16		16		2		2
Borax and Honey		1		1				
Boric Acid Ointment ...		10		10		1		1
Boric Acid Powder ...		12		12		1		1
Brandy	10			10				
Brandy Butter		1		1				
Bread		49	2	51		17	1	18
Bread, Brown		5		5		1		1

Table 3—continued

Samples	Number examined				Number adulterated or otherwise giving rise to irregularity			
	Formal	Informal	Private	Total	Formal	Informal	Private	Total
Breakfast Cereal		3		3		1		1
Butter		50	4	54		3		3
Buttermilk Drink		1		1				
Cake Decorations, Edible ...		10	2	12				
Cake Coating		1		1				
Cake Mixture, sweetened ...		6		6				
Camphorated Oil		12		12				
Castor Oil		16		16				
Cereal Beverage		1		1				
Cheese		34	1	35		1		1
Cheese Spread		7		7		1		1
Chestnut Spread		1		1				
Chewing Compounds ...		2		2				
Chicken, Bottled and canned		4		4		2		2
Chicken, Fresh		1		1				
Chicken Spread		2		2		1		1
Chocolate, Drinking ...		12		12				
Christmas Tree Decorations, Edible		9		9				
Chutney		4		4				
Cider Vinegar		1		1				
Cocoa		21	3	24				
Coconut, Desiccated ...		1	2	3			1	1
Codeine Tablets, Compound		8		8				
Cod Liver Oil		4	1	5				
Coffee		26	3	29				
Coffee Extract, Dry ...		15	4	19				
Coffee and Chicory ...		3		3				
Coffee and Chicory Essence, Liquid, sweetened ...		8		8				

Table 3—continued

Samples	Number examined				Number adulterated or otherwise giving rise to irregularity			
	Formal	Informal	Private	Total	Formal	Informal	Private	Total
Coffee and Chicory Extract, Dry		1		1				
Coffee with Fig Seasoning ...		1		1				
Colouring Materials ...		15	1	16		1		1
Cooking Fat or Oil		12	5	17				
Cornflour		3	5	8				
Cough Medicine and Cough Sweets		29		29		1		1
Cream, Single, Double and Sterilised		61		61		2		2
Cream, Imitation (Powder)		1		1				
Cream of Tartar		3		3				
Crumpets		1		1				
Curry Paste...		3		3				
Curry Powder and Mixture		31	1	32				
Curried Foods		3		3				
Custard Mix			1	1				
Custard Powder		21	3	24		1		1
Dairy Produce, Canned ("Dairy Topping," "Top of the Milk") ...		6		6				
Dessert Mould, Powder ...		6		6				
Diabetic Foods		3		3				
Dripping		7		7				
Eggs, Fresh		1		1				
Epsom Salts		20		20				
Figs, Syrup of, Compound...		6		6				
Fish, Bottled		3		3				
Fish, Canned		38	6	44		2		2
Fish Cakes		1		1		1		1
Fish Dressing		3	2	5				
Fish Fingers, Frozen ...		1		1		1		1

Table 3—continued

Samples	Number examined				Number adulterated or otherwise giving rise to irregularity			
	Formal	Informal	Private	Total	Formal	Informal	Private	Total
Fish, Frozen		1		1				
Fish Paste		16		16				
Fish, Potted		2		2				
Flavouring Materials ...		26	3	29		1		1
Flour, Plain		35	4	39		4	2	6
Flour, Self-raising ...		44	2	46				
Flour Confectionery ...		62		62		9		9
Fruit, Canned and Bottled		74	3	77		7		7
Fruit, Dried		68	12	80		1		1
Fruit Curd		23	1	24				
Fruit, Fresh (Apples, Oranges, etc.) ...		52		52		1		1
Fruit in Jelly, Canned ...		1		1				
Fruit Juice, Bottled and canned		7	2	9		1		1
Fruit and Nuts		1		1				
Fruit, Stewed			1	1			1	1
Gelatine		4		4		1		1
Gin	22			22				
Glaubers Salts		1		1				
Glucose Drink		2		2				
Glycerin		22		22				
Glyceryl Monostearate ...		1		1				
Golden Raising Powder ...		8		8				
Gravy Browning		14	3	17				
Gravy Powder		3	1	4				
Gravy Salt		2		2				
Gravy Sauce		1		1				
Hamburgers, Canned ...		1		1				
Hamburgers, Uncooked ...		1		1		1		1
Headache Tablets ...		16		16				

Table 3—continued

Samples	Number examined				Number adulterated or otherwise giving rise to irregularity			
	Formal	Informal	Private	Total	Formal	Informal	Private	Total
Health Salts		1		1				
Herbal Medicine		2		2				
Herbs, Dried, Culinary ...		22	1	23				
Herbs, Dried, Medicinal ...		1		1				
Honey		15		15				
Hot Dog		1		1				
Ice-Cream		80		80		6		6
Ice-Cream, Dairy		11		11		1		1
Ice-Cream, Cold Mix ...		6		6				
Ice Lollies		40		40		6		6
Indigestion Preparations ...		2		2				
Invalid Food		1		1				
Iodine Paint		1		1				
Iodine, Tincture of ...		12		12				
Jam		37	6	43				
Jelly, Table (Powder and Crystals)		8	2	10				
Jelly, Table, Tablets ...		38	3	41				
Kali		1		1				
Lard		55	4	59				
Laxatives		8		8		1		1
Macaroni		4	1	5				
Malt Extract with Cod Liver Oil		11		11				
Malt Extract and Vitamin Compounds		2		2				
Malt Milk and Cocoa Beverage		8		8				
Malted Milk Beverage ...		3	1	4				
Margarine		18	9	27				
Marmalade		34	1	35				
Marzipan		10		10		1		1

Table 3—continued

Samples	Number examined				Number adulterated or otherwise giving rise to irregularity			
	Formal	Informal	Private	Total	Formal	Informal	Private	Total
Meals, part of		2		2		1		1
Meat Balls in Tomato Sauce, Canned		1		1				
Meat, Canned		45	5	50		8		8
Meat, Cooked		2		2				
Meat, Extract		1		1				
Meat Paste		14		14				
Meat Pies		10	1	11		1		1
Meat and Potato Pies ...		7		7		7		7
Meat, Potted		9		9		2		2
Meat Pudding, Canned ...		2		2				
Meat, Raw		11		11				
Meat Tenderiser		1		1				
Meat and Vegetables, Canned		10		10		2		2
Medicine, (Prescription) ...		1		1		1		1
Meringues		2		2				
Milk	2204	1799	400	4403	124	58	25	207
Milk, Channel Islands ...	280	217		497	12	4		16
Milk, Condensed, Full Cream, sweetened ...		3		3				
Milk, Condensed, Full Cream, unsweetened ...		7	1	8		1		1
Milk, Condensed, Skimmed, sweetened		4		4				
Milk, Dried, Full Cream ...		1	2	3		1		1
Milk, Dried, Compounded ...		3	2	5				
Milk, Dried, Skimmed ...		6	4	10				
Milk Shake, Powder and Syrup		2		2				
Mincemeat		18	3	21		1		1
Mint Jelly			1	1				
Mustard, Compound ...		5	3	8				

Table 3—continued

Samples	Number examined				Number adulterated or otherwise giving rise to irregularity			
	Formal	Informal	Private	Total	Formal	Informal	Private	Total
Mustard Paste		9		9				
Noodles (Egg)		1		1				
Nuts		2		2				
Oatmeal		15		15				
Olive Oil		9		9				
Olive Oil and Raspberry Vinegar		1		1				
Olives, Stuffed		1		1				
Omelette Mixture		1		1				
Paprika		1		1				
Paraffin, Liquid		15		15				
Pastry Mix		2		2				
Pastry, Uncooked ...		2		2				
Peanut Butter		1		1				
Penicillin preparations ...		13		13				
Pepper, Black		4		4				
Pepper, White		34	4	38				
Petroleum Emulsion with Agar-Agar and Phenolphthalein ...		1		1				
Pickles	2	42	2	46	2	2		4
Pie Filling		4	1	5		1		1
Pie Mix		1		1				
Potato Crisps		7		7		4		4
Potatoes, Chipped, Fried ...		1		1		1		1
Proprietary Medicines :—								
Actal Tablets		7		7				
Asmapax Tablets ...		2		2				
Butazolidin Tablets ...		2		2				
Chloromycetin Capsules ...		2		2				
Chloromycetin Palmitate Suspension		2		2				

Table 3—continued

Samples	Number examined				Number adulterated or otherwise giving rise to irregularity			
	Formal	Informal	Private	Total	Formal	Informal	Private	Total
Cough Linctus		5		5		1		1
Diabinese Tablets... ...		2		2				
Distaquaine V-K Suspension		2		2				
Doriden Tablets		2		2				
Edrisal Tablets		2		2				
Ferrodic Tablets		3		3				
Fersamal Tablets ...		4		4				
Fersolate Tablets ...		1		1				
Franol Tablets		2		2				
Gelusil Tablets		2		2				
Hibitane Cream		3		3				
Hydro-Saluric K Tablets		2		2				
Hypon Tablets		8		8				
Icipen V Tablets		4		4				
Largactil Tablets		2		2				
Lobak Tablets		5		5				
Lysivane Tablets		2		2				
Melleril Tablets		2		2				
Metatone		6		6				
Midicel Tablets		2		2				
Multivite Pellets		2		2				
Nembutal Capsules ...		2		2				
Panadol Tablets		5		5				
Paynocil Tablets ...		4		4				
Prodexin Tablets		6		6				
Saluric Tablets		2		2				
Seconal Sodium Capsules		2		2				
Selsun Suspension ...		5		5				
Sparine Tablets		2		2				
Sulphamezathine Tablets		2		2				

Table 3—continued

Samples	Number examined				Number adulterated or otherwise giving rise to irregularity			
	Formal	Informal	Private	Total	Formal	Informal	Private	Total
Sulphatriad Suspension ...		2		2				
Sulphonamide Suspension		5		5		4		4
Travel Sickness Tablets ...		6		6		3		3
Tuinal Pulvules		2		2				
Tyrozets Lozenges ...		7		7				
Veganin Tablets		3		3				
V-CIL-K Tablets		1		1				
Pudding, Canned		5		5				
Pudding, Christmas, etc. ...		27		27		3		3
Pudding Mixtures ...		25		25		1		1
Quinine, Ammoniated Tincture of		1		1				
Ravioli, Canned		1		1				
Rice		3	1	4				
Rice, Ground		1		1				
Rum	17			17				
Rum Butter		1		1				
Rye Bread		1		1				
Saccharin Tablets		11		11				
Sago		4	3	7				
Salad Cream and Salad Dressing		4		4				
Salt, Table		21	7	28				
Sandwiches		2		2		1		1
Sauce, Various		37	1	38				
Sauce Powder		1	2	3				
Sausage, Beef		30		30		7		7
Sausage and Sausage Meat, Pork		55	1	56		19	1	20
Sausage, Canned		1		1		1		1
Sausage, Cumberland ...		2		2				

Table 3—continued

Samples	Number examined				Number adulterated or otherwise giving rise to irregularity			
	Formal	Informal	Private	Total	Formal	Informal	Private	Total
Semolina		12	4	16				
Shandy, Bottled and Canned		3		3		1		1
Slimming Biscuits ...		5		5		1		1
Sodium Carbonate		3		3				
Soft Drinks	1	24		25	1	3		4
,, ,, To be diluted ...		6		6				
Soft Drink Powder and Crystals		7		7		2		2
Soup, Canned		25		25		2		2
Soup, Mixture and Powder		9	5	14		1		1
Spaghetti Milanese, Canned		1		1				
Spices, various		35	6	41				
Spread (Invert Sugar and Honey)		3		3				
Stuffing (Sage and Onion) ...		1		1				
Suet Pudding Mixture ...		4		4				
Suet, Shredded		10	1	11		2		2
Sugar		23	7	30				
Sugar, Demerara		7		7				
Sugar, Icing		2		2				
Sweets (including Chocolates and sweets containing butter)		87		87		7		7
Sweetening Crystals ...		1		1				
Syrup		7	2	9				
Tapioca		15		15				
Tea		50	5	55				
Tea Extract, Dry		1		1				
Teething Powders and Syrups		9		9				
Throat Lozenges, etc. ...		3		3				
Tomatoes, Canned		1		1				

Table 3—continued

Samples	Number examined				Number adulterated or otherwise giving rise to irregularity			
	Formal	Informal	Private	Total	Formal	Informal	Private	Total
Tomatoes, Fresh		4	1	5				
Tomato Juice, Canned and Bottled		4		4		2		2
Tomato Paste and Puree ...		11		11		8		8
Treacle		8		8				
Trifle Mixture		2		2				
Vegetables, Canned ...		24	1	25		1		1
Vegetables, Dried		41	8	49		2		2
Vegetables, Fresh		16		16		2		2
Vegetable Salad (jar) ...		1		1		1		1
Vinegar		25	3	28				
Vinegar, Distilled		2		2				
Vinegar, Wine		1		1				
Vitamin Drink, Powder ...		1		1				
Vitamin and Mineral Food			1	1				
Vitamin Tablets, etc. ...		14		14				
Welsh Rarebit		1		1				
Wheat Germ, Stabilised ...		1		1				
Whipping Compound, Canned		1		1				
Whisky	41			41				
Wine (British Sherry, British Ruby, etc.) ...		9		9				
Yeast, Dried		1		1				
Yeast Tablets		1		1				
Yoghourt		4		4				
Zinc Ointments		15		15				
Totals ...	2577	5003	610	8190	139	265	32	436

The Number of Commodities

The variety of commodities on sale is now very large, and this is reflected in the number of different articles of which samples have been taken and submitted for analysis. Two hundred and ninety-seven different commodities consisting of food and drugs were examined during the year.

In order to obtain adequate sampling of the common articles of food it is the practice to issue quarterly lists of samples which assist the sampling officers to correlate their samples one with another and at the same time ensure that each area is satisfactorily sampled in respect of any particular commodity. Owing to the desirability of allowing considerable latitude in the sampling of other articles where this may be indicated in the public interest, the variety of samples actually examined is considerably increased by the inclusion of commodities in less common demand.

Total Adulteration

During the year under review, 8,190 samples of food and drugs were submitted for examination under the Act, and of these 436 were reported upon adversely ; the total adulteration was, therefore, 5·3 per cent. This is lower than the percentage of adulteration for the previous year (1965) when the figure was 6·4 per cent.

In table 4 the percentages of adulteration are given for the past ten years. It will be seen that during this period the lowest figure is 3·8 which was reached during the year 1962 and that the average figure is 5·2 per cent. In general, the adulteration rate during and immediately subsequent to the war was considerably greater than that found in preceding years. The figure for the year under review is rather high when compared with the figures for the last ten years, and it does not fall within the range of the adulteration rate during the ten years 1929-1938 which preceded the war when the percentage adulteration varied from as little as 2·6 to 4·2. The figures for 1966 and for the previous three years are, however, influenced by increased testing of milks for antibiotics and are not, therefore, directly comparable with figures in other years.

Table 4

Percentage of Adulteration of County Samples of Food and Drugs, 1957-1966

Year	Total No. of Samples	No. of Adulterated Samples	Percentage of Adulteration
1957	8,239	349	4·2
1958	8,225	405	4·9
1959	8,256	373	4·5
1960	7,857	361	4·6
1961	8,352	414	4·9
1962	8,784	334	3·8
1963	8,243	480	5·8
1964	7,766	562	7·2
1965	7,959	512	6·4
1966	8,190	436	5·3
1957–1966	81,871	4,226	5·2

Analysis of County Food and Drug Samples

Table 5 gives the percentage of adulteration over the last ten years side by side with the various types of samples and with the number of samples taken per 100,000 of the population. The total number of samples and the number of samples per 100,000 of the population for the year under review have been well maintained at the level reached during the year 1947 (6,819 and 505 respectively) and the figures for all subsequent years are much higher than the corresponding figures for any of the previous years in the history of the County Laboratory.

Table 5

Year	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
Percentage of Adulteration ...	4·2	4·9	4·5	4·6	4·9	3·8	5·8	7·2	6·4	5·3
Total Samples ...	8,239	8,225	8,256	7,857	8,352	8,784	8,243	7,766	7,959	8,190
Formal Samples	3,331	3,337	3,321	3,012	2,995	3,230	2,686	2,528	2,216	2,577
Informal Samples	4,589	4,568	4,627	4,589	5,025	5,122	5,211	4,855	5,333	5,003
Private Samples	319	320	308	256	332	432	346	383	410	610
NumberofSamples per 100,000 of the population	588	581	576	548	557	586	539	541	534	550

Total Adulteration : the County compared with other areas.

Table 6 gives the percentage of adulteration for the year 1966 for certain other Food and Drugs Authorities whose figures were available at the time of writing. I am indebted to the Public Analysts of the various districts for the information included in this table and also for the figures included in tables 13 and 17. It will be seen that the figure for the County of Lancaster, *viz*:, 5·3 per cent. is higher than the average (4·1 per cent.) for the Authorities mentioned. The range of adulteration for the areas included in the table varied from 1·0 to 8·9 per cent.

Table 6

Total Adulteration, 1966. Various Areas.

Area	No. of Samples	Percent. of Adult.	Area	No. of Samples	Percent. of Adult.
Derbyshire, County	2,637	4·9	Birmingham ...	4,720	1·2
Durham, County ...	3,682	2·8	Bristol	1,620	1·8
Kent, County ...	2,614	6·3	Leeds...	1,195	8·9
Somersetshire, County ...	3,839	2·8	Leicester	1,991	4·2
			Liverpool	3,668	3·4
Staffordshire, County ...	4,738	3·2	Manchester	2,519	1·1
Surrey, County	956	5·3	Salford	613	8·0
Worcestershire, County ...	7,135	7·1	Southampton ...	853	1·0

Adulteration in County Districts, etc.

There are 91 Districts shown in the Area of the County Food and Drugs Authority for the year under review.

Table 7 shows the number of samples taken and the number of adulterated samples in each of the districts together with those relating to 13 autonomous areas. An examination of the table will show that adulteration was nil in eight of the County Districts as against nil in three districts for the year 1965. None of the autonomous areas showed a total freedom from adulteration.

Table 7

Adulteration in the County Districts and in the areas of 13 Autonomous Food and Drugs Authorities during the year, 1966.

District	Milk		Other Articles		Total	
	Samples	Adult.	Samples	Adult.	Samples	Adult.
Abram U.D.C.	23	0	9	0	32	0
Adlington U.D.C.	17	1	15	0	32	1
Ashton-in-Makerfield U.D.C. ...	55	4	64	10	119	14
Aspull U.D.C.	23	3	16	3	39	6
Atherton U.D.C.	51	15	38	9	89	24
Audenshaw U.D.C.	13	1	35	3	48	4
Bacup Borough	103	2	37	2	140	4
Barrowford U.D.C.	23	0	9	0	32	0
Billinge and Winstanley U.D.C.	21	1	25	0	46	1
Blackburn R.D.C.	67	5	33	4	100	9
Blackrod U.D.C.	23	5	11	1	34	6
Brierfield U.D.C.	18	0	17	1	35	1
Burnley R.D.C.	67	2	17	0	84	2
Carnforth U.D.C.	16	1	20	1	36	2
Chadderton U.D.C.	66	1	65	3	131	4
Chorley R.D.C.	119	9	78	1	197	10
Church U.D.C.	9	0	21	0	30	0
Clayton-le-Moors U.D.C. ...	12	1	18	1	30	2
Clitheroe Borough	39	0	26	3	65	3
Clitheroe R.D.C.	47	4	23	1	70	5
Colne Borough	46	1	51	1	97	2
Crompton U.D.C.	51	2	36	1	87	3
Dalton-in-Furness U.D.C. ...	44	1	24	1	68	2
Denton U.D.C.	49	7	87	10	136	17
Droylsden U.D.C.	37	0	64	6	101	6
Failsworth U.D.C.	36	0	51	4	87	4
Farnworth Borough	112	7	80	2	192	9

Table 7—continued

District	Milk		Other Articles		Total	
	Samples	Adult.	Samples	Adult.	Samples	Adult.
Fleetwood Borough	48	2	85	3	133	5
Formby U.D.C.	26	3	49	0	75	3
Fullwood U.D.C.	43	1	52	4	95	5
Fylde R.D.C.	41	3	49	2	90	5
Garstang R.D.C.	65	3	36	2	101	5
Golborne U.D.C.	72	1	58	4	130	5
Grange U.D.C.	5	1	13	0	18	1
Gt. Harwood U.D.C.	34	2	23	0	57	2
Haslingden Borough	59	2	23	1	82	3
Haydock U.D.C.	30	0	33	0	63	0
Heywood Borough	77	3	78	6	155	9
Hindley U.D.C.	47	2	67	3	114	5
Horwich U.D.C.	51	1	43	3	94	4
Ince-in-Makerfield U.D.C. ...	99	5	45	2	144	7
Irlam U.D.C.	26	3	44	5	70	8
Kearsley U.D.C.	16	3	26	0	42	3
Kirkham U.D.C.	30	0	19	2	49	2
Lancaster R.D.C.	86	3	60	3	146	6
Lees U.D.C.	21	0	13	2	34	2
Leyland U.D.C.	38	0	65	3	103	3
Litherland U.D.C.	72	4	54	2	126	6
Little Lever U.D.C.	19	0	21	0	40	0
Littleborough U.D.C.	49	2	36	4	85	6
Longridge U.D.C.	19	4	15	1	34	5
Lunesdale R.D.C.	45	3	25	2	70	5
Lytham St. Annes Borough ...	85	2	95	5	180	7
Milnrow U.D.C.	46	2	19	0	65	2
Mossley Borough	17	0	24	2	41	2
Nelson Borough	80	2	80	5	160	7
North Lonsdale R.D.C. ...	175	15	28	0	203	15

Table 7—continued

District	Milk		Other Articles		Total	
	Samples	Adult.	Samples	Adult.	Samples	Adult.
Ormskirk U.D.C.	57	0	76	1	133	1
Orrell U.D.C.	30	0	31	3	61	3
Oswaldtwistle U.D.C.	87	1	26	1	113	2
Padiham U.D.C.	28	2	32	5	60	7
Poulton-le-Fylde U.D.C. ...	28	0	32	1	60	1
Preesall U.D.C.	12	0	8	1	20	1
Prescot U.D.C.	30	0	38	1	68	1
Preston R.D.C.	129	8	118	8	247	16
Prestwich Borough	52	1	89	6	141	7
Radcliffe Borough	65	5	64	3	129	8
Rainford U.D.C.	20	3	12	0	32	3
Ramsbottom U.D.C.	41	0	30	3	71	3
Rawtenstall Borough	65	3	50	3	115	6
Rishton U.D.C.	19	0	13	2	32	2
Royton U.D.C.	36	3	47	3	83	6
Skelmersdale U.D.C.	9	0	28	1	37	1
Standish-with-Langtree U.D.C.	30	0	22	1	52	1
Thornton-Cleveleys U.D.C. ...	45	0	47	7	92	7
Tottington U.D.C.	28	2	14	1	42	3
Trawden U.D.C.	14	0	3	0	17	0
Turton U.D.C.	64	2	35	5	99	7
Tyldesley U.D.C.	40	0	50	5	90	5
Ulverston U.D.C.	46	2	26	3	72	5
Upholland U.D.C.	22	0	24	1	46	1
Walton-le-Dale U.D.C.	85	2	54	4	139	6
Wardle U.D.C.	19	0	10	0	29	0
Warrington R.D.C.	104	1	93	5	197	6
West Lancashire R.D.C. ...	93	3	176	8	269	11
Westhoughton U.D.C.	108	6	43	4	151	10
Whiston R.D.C.	120	1	161	3	281	4

Table 7—continued

District	Milk		Other Articles		Total	
	Samples	Adult.	Samples	Adult.	Samples	Adult.
Whitefield U.D.C.	21	1	44	3	65	4
Whitworth U.D.C.	36	2	16	0	52	2
Wigan R.D.C.	23	3	21	3	44	6
Withnell U.D.C.	10	0	5	0	15	0
Miscellaneous	79	11	1	0	80	11
Total County Districts	4,403	207	3,787	229	8,190	436
Thirteen Autonomous Food and Drugs Authorities	1,074	63	1,335	106	2,409	169
Total—All Sources	5,477	270	5,122	335	10,599	605

Adulteration of Milk in the County

The number of milks submitted under the Food and Drugs Act during the year was 4,403 and of these 207 were reported against ; the amount of adulteration was, therefore, 4·7 per cent. This figure, as will be seen from table 8 is higher than the average for the last ten years. As already mentioned, the figure for the year under review is to some extent due to the testing of samples for antibiotics.

Table 8

Percentage of Adulteration of Milk Samples, 1957-1966

Year	No. of Samples	No. of Adulterated Samples	Percentage of Adulteration
1957	5,411	190	3·5
1958	5,385	231	4·3
1959	5,294	198	3·7
1960	5,051	178	3·5
1961	5,201	180	3·5
1962	5,403	156	2·9
1963	4,823	250	5·2
1964	4,268	319	7·5
1965	4,415	290	6·6
1966	4,403	207	4·7
Total ...	49,654	2,199	4·4

The Adulteration of Milk in the County for each month of the year

In table 9 will be found the figures for the number of milk samples submitted by County Sampling Officers during each month of the year together with the number adulterated and the percentage adulteration. In general the percentage adulteration usually increases during winter and decreases in the autumn. The increasing adulteration of milk noted during the winter and first half of the year may be due to two factors : (*a*) the poorer quality of milk towards the end of the winter enables cases of slight adulteration to be detected more readily and, (*b*) the scarcity of milk in the winter may, in some instances, be an incentive to adulteration.

Table 9

Milk—Monthly Adulteration, 1966

Month	Number of Samples	Number Adulterated	Percentage of Adulteration
January	439	27	6·1
February	356	35	9·8
March	378	33	8·7
April	355	16	4·5
May	374	20	5·3
June	341	20	5·9
July	356	8	2·2
August	337	11	3·3
September	374	8	2·1
October	458	9	2·0
November	413	14	3·4
December	222	6	2·7
Total	4,403	207	4·7

In the following table will be found particulars of the various types of adulteration and the number of samples under each heading :—

Table 10

			Per cent.
Milks deficient in fat only	78	*or*	1·78
Milks containing added water only	72	*or*	1·64
Milks deficient in fat and containing added water	14	*or*	0·31
Milks deficient in fat and containing penicillin	2	*or*	0·04
Milks incorrectly designated	3	*or*	0·07
Milks containing Penicillin	19	*or*	0·43
Milks containing Penicillin and added water ...	1	*or*	0·03
Milks containing foreign matter, etc.	18	*or*	0·40
Milks containing preservatives	Nil	*or*	Nil
Milks containing colouring matter	Nil	*or*	Nil
	207		4·7

			Per Cent.
Milks containing more than 3 per cent. added water	30	*or*	0·68
Milks 10 per cent. or more deficient in fat. ...	40	*or*	0·90

Alternatively the milk adulteration can be expressed in terms of the adulteration of the various grades of milk as shown in the following table.

Table 11

Grade of Milk	Number of Samples	Number Adulterated	Percentage of Adulteration
Pasteurised	1,587	41	2·58
Sterilised	433	7	1·61
Untreated	2,383	159	6·67
*Channel Islands (all grades)	497	16	3·21

* The figures for Channel Islands Milks are included here for completeness but for all other purposes in this report they are considered separately as they come under Regulations of their own, see page 45.

It will be noted from table 11 that pasteurised and especially sterilised milks show a lower rate of adulteration than untreated milks. This is primarily because untreated milks are normally bulked before processing and irregularities in individual churns or consignments may thereby be obscured.

" Serious " Milk Adulteration

A study of table 10 reveals that 1·58 per cent. of the total milk adulteration may be considered "serious." This figure includes 30 samples which contained added water and 40 samples which were deficient in fat. A number of these seriously adulterated samples were taken informally and could not therefore, be the subject of prosecutions. In several other instances corresponding appeal-to cow samples of poor quality were submitted by the Sampling Officers. Legal proceedings were instituted, however, in respect of 27 samples of which 19 contained extraneous water or were deficient in fat, six contained penicillin and two contained foreign matter.

In table 12 are given details in regard to the adulterated milk samples, submitted by County Sampling Officers, which were the subject of legal proceedings, together with the results of the prosecutions.

Table 12

Milk Prosecutions, 1966

Number of Sample	Nature of Adulteration or Irregularity	Observations
E.2798	Deficient 4·9 per cent. solids-not-fat ; freezing point indicated 7·4 per cent. extraneous water.	Section 32 (3), Food and Drugs Act, 1955. Fined £30 and £9.17.0 costs.
N.3897	Contained 2·5 I.U's penicillin per ml.	Same vendor. Section 2, Food and Drugs Act, 1955. Fined £5 and £9.4.0 costs.
N.3898	Contained 0·075 I.U. penicillin per ml.	
C.1779	Deficient 8·2 per cent. solids-not fat ; freezing point indicated 8·8 per cent. extraneous water.	Same vendor. Section 32 (3), Food and Drugs Act, 1955. Fined £15 and £12.15.0 costs.
C.1780	Deficient 19·8 per cent. solids-not-fat ; freezing point indicated 22·7 per cent. extraneous water.	
C.1781	Deficient 18·9 per cent. solids-not-fat ; freezing point indicated 20·8 per cent. extraneous water.	
E.2893	Contained one empty potato crisps plastic bag, six parts by volume of particles of pigment from the printing on the above bag, per 100,000 parts by volume of the milk and one used metal foil bottle cap.	Section 2, Food and Drugs Act, 1955. Fined £75 and £19.10.0 costs.
E.2932	Deficient 21·6 per cent. fat.	Section 2, Food and Drugs Act, 1955. Fined £10 and £9.17.0 costs.

Table 12—continued

Number of Sample	Nature of Adulteration of Irregularity	Observations
N.4061	Deficient 26·0 per cent. fat.	Section 2, Food and Drugs Act, 1955. Fined £5 and £8.16.0 costs.
S.7979	Contained 0·45 I.U. penicillin per ml.	Same vendor. Section 2, Food and Drugs Act, 1955. Fined £12 and £17.12.0 costs.
S.7980	Contained 0·06 I.U. penicillin per ml.	
N.4197	Deficient 8·9 per cent. solids-not-fat; freezing point indicated 5·1 per cent. extraneous water.	Section 32 (3), Food and Drugs Act, 1955. Fined £20 and £9.17.0 costs.
N.4378	Deficient 17·3 per cent. fat and 67·7 per cent. solids-not-fat; freezing point indicated 62·4 per cent. extraneous water.	Section 32 (3), Food and Drugs Act, 1955. Fined £5 and £7.15.0 costs.
C.2454	Deficient 7·4 per cent, solids-not-fat; freezing point indicated 9·4 per cent. extraneous water.	Same vendor. Section 32 (3), Food and Drugs Act, 1955. Fined £21 and £7.10.0 costs.
C.2455	Deficient 3·0 per cent. solids-not-fat; freezing point indicated 5·1 per cent. extraneous water.	
C.2459	Deficient 6·5 per cent. solids-not-fat ; freezing point indicated 9·8 per cent. extraneous water.	
C.2640	Deficient 42·6 per cent. fat; freezing point indicated 1·0 per cent. extraneous water.	Section 2, Food and Drugs Act, 1955. Fined £5 and £5.13.0 costs. See also Sample No. C.2641, Channel Islands Milk, Table 21.
N.5299	Deficient 17·6 per cent. solids-not-fat ; freezing point indicated 15·9 per cent. extraneous water.	Section 32 (3), Food and Drugs Act, 1955. Fined £10 and £7.15.0 costs.
S.9345	Deficient 11·2 per cent. solids-not-fat ; freezing point indicated 10·2 per cent. extraneous water.	Section 32 (3), Food and Drugs Act, 1955. Fined £15 and £9.17.0 costs.
N.5520	Contained 0·30 I.U. penicillin per ml.	Section 2, Food and Drugs Act, 1955. Conditional discharge on payment of £5.13.0 costs.

Table 12—continued

Number of Sample	Nature of Adulteration of Irregularity	Observations
S.9532	Contained 0·25 I.U. penicillin per ml.	Sections 2 and 113 (3), Food and Drugs Act, 1955. Fined £10 and £8.16.0. costs.
E.4399	Deficient 31·6 per cent. fat and 41·6 per cent. solids-not-fat ; freezing point indicated 40·1 per cent. extraneous water.	
E.4400	Deficient 20·0 per cent. fat and 35·2 per cent. solids-not-fat ; freezing point indicated 33·8 per cent. extraneous water.	Same vendor. Section 32 (3), Food and Drugs Act, 1955. Fined £32 and £18.8.0 costs.
E.4401	Deficient 27·2 per cent. solids-not-fat ; freezing point indicated 26·1 per cent. extraneous water.	
E.4402	Deficient 10·4 per cent. solids-not-fats ; freezing point indicated 8·2 per cent. extraneous water.	
S.9599	Contained six fragments of broken glass weighing in all 6·5 milligrams.	Section 2, Food and Drugs Act, 1955. Fined £15 and £7.15.0 costs.
E.4481	Deficient 18·3 per cent. fat.	Section 2, Food and Drugs Act, 1955. Fined £12 and £13 costs.
M.720	Sample contained fragments of glass.	Sections 2 and 113 (3), Food and Drugs Act, 1955. Fined £5 and £7.17.6 costs.

Adulteration of Milk : the County compared with other Areas

In the following table the percentage of milk adulteration for the year 1966 is given for a number of districts in England whose figures were available at the time of writing. The corresponding figure for the County of Lancaster was 4·7 per cent. as against 6·6 per cent. in the year 1965 and 7·5 per cent. in the year 1964. The percentage of milk adulteration in the County for the year under review is higher than the average (2·8 per cent.) for the areas included in the table. The rate of adulteration in these districts varied from Nil to 6·9 per cent.

Table 13

Milk Adulteration, 1966. Various Areas

Area	Number of Samples	Per cent. of Adult.	Area	Number of Samples	Per cent. of Adult.
Derbyshire, County	868	4·7	Birmingham ...	1,788	1·6
Durham, County ...	1,099	1·6	Bristol	580	1·7
Kent, County ...	686	3·8	Leeds...	472	5·1
*Somersetshire, County	2,413	1·5	Leicester	1,003	4·8
Staffordshire, ... County	3,471	2·3	Liverpool	2,313	2·9
Surrey, County ...	358	4·5	Manchester	722	0·3
Worcestershire, ... County	4,102	6·9	Salford	245	Nil
			Southampton ...	145	Nil

*Includes 1,018 Samples of Channel Islands Milk.

The Standards of Quality for Milk

In some countries there is a definite standard of quality required for liquid milk sold to the public ; it is then illegal to sell milk which is below that standard. In this country the law is less stringent. The present Food and Drugs Act contains no standards for milk . The position remains very much as it was before this Act came into operation, in that the one requirement laid down by law is that milk must be sold to each purchaser in the condition in which it came from the cow. If it attains a certain limit or exceeds it, it may be regarded as above suspicion, and if it is below that limit it only becomes suspect, and it falls to the lot of the person who sold it to establish, if he can, before the Court that nothing has been added to it, or no ingredient abstracted from it.

In furtherance of the principle outlined in the preceding paragraph, presumptive limits for the composition of milk were established after exhaustive enquiries by a Government Committee appointed by the Board of Agriculture in 1900. The deliberations of this Committee resulted in the making of the Sale of Milk Regulations, 1901, which were modified as regards skimmed milk in 1912. These Regulations were reproduced, in effect unaltered, in October, 1939, in the Sale of Milk Regulations, 1939, and they have been continued in force by the Food and Drugs Act, 1955. The presumptive standards are as follows :—

(1) Where a sample of milk (not being milk sold as separated, or condensed, milk) contains less than 3 per cent. of milk-fat, it shall be presumed for the purposes of the Food and Drugs Act, 1955, until the contrary is proved, that the milk is not genuine, by reason of the abstraction therefrom of milk-fat, or the addition thereto of water.

(2) Where a sample of milk (not being milk sold as separated, or condensed, milk) contains less than 8·5 per cent. of milk-solids other than milk-fat, it shall be presumed for the purposes of the Food and Drugs Act, 1955, until the contrary is proved, that the milk is not genuine, by reason of the abstraction therefrom of milk-solids other than milk-fat, or the addition thereto of water.

(3) Where a sample of separated milk (not being condensed milk) contains less than 8·7 per cent. of milk-solids other than milk-fat, it shall be presumed for the purposes of the Food and Drugs Act, 1955, until the contrary is proved, that the milk is not genuine, by reason of the abstraction therefrom of milk-solids other than milk-fat, or the addition thereto of water.

The above presumptive standards with regard to the composition of milk have, therefore, been operative for some 60 years. Within recent years, however, they have been under a considerable amount of criticism, implying that they do not accord with present day conditions. Another Government Committee was, therefore, appointed during the year 1958 to consider the composition of milk from the standpoint of human nutrition and animal husbandry and to recommend any changes in legislation considered desirable. This Committee under the Chairmanship of Dr. J. W. Cook published its report in September 1960. It recommended as far as standards of composition are concerned, that milk should still be sold as it comes from the cow but that within ten years a fixed minimum standard of 8·5 per cent. solids not-fat should apply to milk sold by retail. Similarly, for milk on sale to the consumer the presumptive standard of 3 per cent. for milk-fat should, within five years, be made an absolute minimum standard and the abstraction of fat from milk intended for sale as whole milk should be a specific legal offence. Another recommendation was that the Hortvet Freezing Point Test should be accepted in legal proceedings as proof (subject to certain provisos) of the presence or absence of extraneous water.

Channel Islands Milk and South Devon Milk

In addition to the presumptive standards of quality, which are applicable to all milk, a special standard for milk-fat of not less than four per cent. was originally prescribed in the Milk (Control and Maximum Prices) (Great Britain) Order, 1947, for " Channel Islands Milk " and for " South Devon Milk." The enforcement of this standard was the responsibility of the Ministry of Agriculture, Fisheries and Food, but during the year 1956, the Milk and Dairies (Channel Islands and South Devon Milk) Regulations came into operation and made food and drugs authorities responsible for enforcing the standard. " Channel Islands Milk " and " South Devon Milk " are defined by the Milk (Great Britain) Order, 1965, as amended, as being milk (*a*) which is produced from cows of the Channel Islands or South Devon Breed and (*b*) which is labelled " Channel Islands Milk," " Jersey Milk," " Guernsey Milk " or " South Devon Milk " when sold in a container. This last Order also prescribes maximum prices for Channel Islands and South Devon Milk. The enforcement of the maximum price however, is still the responsibility of the Ministry of Agriculture, Fisheries and Food. During the year 1966, 585 samples of Channel Islands Milk were examined (497 were submitted by County Sampling Officers, and 88 by Autonomous Authorities). They were found upon analysis to have an average milk-fat content of 4·81 per cent. and an average solids-not-fat content of 9·06 per cent.

Of the 585 samples examined 563 were found to be satisfactory, which corresponds to an adulteration rate of 3·8 per cent. The following brief details refer to the 22 samples (sixteen County) reported upon adversely. Legal proceedings were successfully instituted in respect of two samples. No. C.2641 contained 7·9 per cent. of extraneous water and the producer was fined £5 and ordered to pay £5 13. 0. costs. The other sample, No. C.3132, contained 0·1 I.U. penicillin per ml. and the producer was fined £5 and ordered to pay £9 17s. 0d. costs. Samples No's. N.3784, S.7629, N.4025, S.7918, S.8443, E.3421, N.4579 and S.9197 had fat contents varying between 3·40 and 3·95 per cent. and the producers concerned were all cautioned. Of the remaining six samples five were found to contain small amounts of penicillin and the producers concerned were cautioned and the Milk Marketing Board informed. The sixth sample was incorrectly labelled and the dairy was informed. Brief details of all the unsatisfactory County samples will be found in table 21.

Of the six unsatisfactory samples from Autonomous Food and Drugs Authorities two samples, both submitted by the same authority, were found to contain 0·08 I.U. and 3·0 I.U's of penicillin per ml. respectively and in each instance the producers concerned were cautioned and the Milk Marketing Board informed. Also, as regards the latter sample a follow-up sample proved to be genuine. Three of the remaining four samples (two from the same authority) had fat contents of 3·50, 3·65 and 3·95 per cent. respectively and the producers were each cautioned. The last sample of Pasteurised Channel Islands Milk, had a fat content of 3·62 per cent. and it was subsequently found that the dairy concerned had mistakenly used a Channel Islands milk bottle cap on an ordinary bottle of milk.

The Average Composition of Milk during the Year

Genuine milk has not always the same composition. There are natural variations in the amounts of both fat and solids-not-fat in milk as drawn from the cow. It, therefore, becomes a matter not only of interest but also of importance and significance, to know the average values for these two constituents. This information is given for the year 1966 in table 14, where it will be seen that the average figure for fat is 3·70 per cent., for solids-not-fat 8·63 per cent. and for total solids 12·33 per cent.

It should be pointed out that the average compositions and frequencies included in this section of the Report are calculated from the results of all the samples of milk (other than Channel Islands milk) received ; that is to say, there are included all adulterated samples and further, all appeal-to-cow samples, whether they were above or below the limits for fat and solids-not-fat laid down by the Sale of Milk Regulations. The figures for average composition calculated on this basis will, therefore, tend to be somewhat lower than those for genuine milk sold in the County.

Table 14

Average Composition of Milk, 1966

Month	Number of Samples*	Fat per cent.	Solids-not-fat per cent.	Total Solids per cent.
January ...	454	3·68	8·57	12·25
February ...	1,183 359	3·63 3·62	8·57 8·56	12·20 12·18
March	370	3·60	8·58	12·18
April	355	3·62	8·59	12·21
May	1,073 374	3·60 3·61	8·62 8·64	12·22 12·25
June	344	3·57	8·65	12·22
July	363	3·61	8·65	12·26
August ...	1,090 337	3·71 3·73	8·68 8·70	12·39 12·43
September ...	390	3·78	8·69	12·47
October ...	460	3·91	8·69	12·60
November ...	1,100 413	3·86 3·84	8·65 8·60	12·51 12·44
December ...	227	3·78	8·61	12·39
Whole year ...	4,446	3·70	8·63	12·33

*Includes Appeal-to-Cow samples but does not include Channel Islands milk and fifteen samples of milk examined for foreign matter only.

The Average Composition of Milk for each Month of the Year

Table 14 also includes the figures for the averages of fat and solids-not-fat for each month of the year. As regards fat it will be seen that June has the lowest figure, 3·57 per cent., and October the highest, 3·91 per cent. In respect of solids-not-fat, the lowest figure was obtained in February, 8·56 per cent., and the highest in August, the figure then being 8·70 per cent. These variations, particularly in respect of fat content, have been the general experience for many years, the fat content usually being at its lowest in the spring and at its highest in the autumn. Solids-not-fat tend to be lower in the winter.

The Average Composition of Morning and Evening Milk during the Year

Usually, when samples are submitted, the information is given whether they are morning or evening milks. It has, therefore, been possible to classify them so as to show the average composition of morning and evening milks separately.

When cows are milked at the usual intervals the evening milk, owing to the shorter interval, is richer in fat than the morning milk, while there is little if any difference as a rule in solids-not-fat. This is illustrated in table 15 below, where the average fat for morning milk is 3·60 per cent., and the evening fat 3·94 per cent. ; the fat in the evening milk being greater by 0·34 per cent., while the averages for solids-not-fat are very similar for both morning and evening milk.

Table 15

The Average Composition of Morning and Evening Milk during the Year 1966

	Number of Samples*	Fat per cent.	Solids-not-fat per cent.	Total solids per cent.
Morning Milk ...	981	3·60	8·63	12·23
Evening Milk ...	744	3·94	8·67	12·61
Mixed Milk ...	49	3·69	8·64	12·33
Unknown ...	2,672	3·67	8·61	12·28
Total ...	4,446	3·70	8·63	12·33

*Includes Appeal-to-Cow samples but does not include Channel Islands milk and fifteen samples of milk examined for foreign matter only.

The Average Composition of Milk : compared with past years

In table 16 the average composition of all the milks examined is set out for the period 1910-1966. It will be seen that the average figure for fat does not vary greatly from year to year. In respect of solids-not-fat there is very little difference in the averages for the years 1910-1940. Since 1940, however, it will be noted there has been an appreciable decrease in solids-not-fat, the lowest figure of 8·55 per cent. being obtained in the year 1943. The average for solids-not-fat for the year under review was 8·63 per cent., while the average for the whole period for which records have been kept is 8·78 per cent. Since the year 1943 there has been, in general, a tendency for solids-not-fat to show an upward trend but they are still appreciably below the pre-war figures.

Table 16

Average Composition of Milk. 1910-1966

Year	Number of Samples	Fat per cent.	Solids-not-fat per cent.	Total Solids per cent.
1910 to 1930 ...	56,028	3·67	8·90	12·57
1931	3,090	3·84	8·81	12·65
1932	3,205	3·77	8·85	12·62
1933	3,060	3·76	8·82	12·58
1934	3,310	3·74	8·81	12·55
1935	3,422	3·75	8·84	12·59
1936	3,098	3·73	8·88	12·61
1937	3,278	3·74	8·84	12·58
1938	3,398	3·70	8·78	12·48
1939	3,128	3·67	8·78	12·45
1940	2,144	3·70	8·79	12·49
1941	1,866	3·70	8·64	12·34
1942	1,516	3·75	8·66	12·41
1943	1,489	3·70	8·55	12·25
1944	1,197	3·69	8·57	12·26
1945	1,096	3·72	8·57	12·29
1946	2,776	3·75	8·58	12·33
1947	4,625	3·75	8·63	12·38
1948	4,523	3·67	8·64	12·31
1949	5,210	3·66	8·65	12·31
1950	5,362	3·68	8·67	12·35
1951	5,839	3·67	8·65	12·32
1952	5,844	3·67	8·68	12·35
1953	5,922	3·68	8·68	12·36
1954	5,182	3·71	8·65	12·36
1955	5,686	3·68	8·66	12·34
1956	5,524	3·71	8·59	12·30
1957	5,485	3·68	8·63	12·31
1958	5,439	3·68	8·63	12·31
1959	5,304	3·62	8·62	12·24
1960	5,062	3·64	8·66	12·30
1961	5,216	3·66	8·66	12·32
1962	5,420	3·70	8·61	12·31
1963	4,825	3·69	8·60	12·29
1964	4,283	3·70	8·60	12·30
1965	4,430	3·72	8·65	12·37
1966	4,446	3·70	8·63	12·33
1910 to 1966 ...	200,728*	3·71	8·78	12·49

* Does not include Channel Islands milk and 53 samples of Milk examined for foreign matter only.

Composition of Milk : the County compared with Other Areas

In table 17 below, figures are given for the composition of milk during the year 1966 in the areas of 15 other Food and Drugs Authorities. The corresponding figures for the County of Lancaster based upon 4,446 samples of milk are fat 3·70 per cent., solids-not-fat 8·63 per cent. and total solids 12·33 per cent. It will be noted that the Lancashire figure for fat is almost identical with the average for the other areas and that the figure for solids-not-fat is only lower than the average by 0·09 per cent. The average figures for the areas listed are fat 3·69 per cent., and solids-not-fat 8·72 per cent.

Table 17

Composition of Milk, 1966. Various Areas.

Area	Number of Samples	Fat per cent.	Solids-not-fat per cent.	Total Solids per cent.
Derbyshire, County ...	874	3·71	8·61	12·32
Durham, County ...	1,120	3·71	8·67	12·38
Kent, County	687	3·68	8·69	12·37
Somersetshire, County ...	1,426	3·72	8·64	12·36
Staffordshire, County ...	3,531	3·72	8·70	12·42
Surrey, County	373	3·71	8·71	12·42
Worcestershire, County	4,133	3·70	8·67	12·37
Birmingham	1,788	3·69	8·64	12·33
Bristol	560	3·63	8·87	12·50
Leeds	472	3·78	8·79	12·57
Leicester	1,003	3·72	8·67	12·39
Liverpool	2,313	3·79	8·77	12·56
Manchester	722	3·59	8·80	12·39
Salford	245	3·51	8·73	12·24
Southampton	138	3·64	8·91	12·55

The Composition of Milk : Frequencies

The 4,446 samples of milk examined for chemical composition during the year have been arranged in table 18 to show the number of samples having the same percentage of fat, or, in other words, the

frequency with which each percentage of fat, differing by 0·1 per cent. occurred. The table has been shortened by placing in separate groups all samples containing less than 2·5 per cent. and above 3·9 per cent. This information is given for the whole year and for each month of the year.

This table gives different information from figures for averages. It shows that, as in previous years, there are comparatively few samples below 3·0 per cent. It also shows how the figures from which the averages are calculated are distributed, information which is not obtainable from the figures for averages alone.

In this table, and the following one, table 19, all samples of milk are included whether adulterated or not, and also appeal-to-cow samples.

Table 18
Composition of Milk : Frequencies
Fat

Per cent.	Number of Samples												
	Jan.	Feb.	Mar.	Apl.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Under 2·5	1	3	0	0	2	1	1	1	4	1	4	1	19
2·5	2	0	0	1	2	0	0	1	1	0	0	0	7
2·6	1	0	0	0	4	1	1	1	1	0	1	0	10
2·7	2	0	1	4	0	2	0	1	6	1	1	0	18
2·8	2	4	1	2	5	3	3	0	1	0	0	0	21
2·9	3	6	4	2	2	5	0	1	1	1	2	1	28
3·0	9	9	10	8	10	9	6	5	11	3	2	1	83
3·1	7	20	13	9	9	19	15	6	6	15	4	3	126
3·2	19	13	12	18	10	13	18	13	8	9	7	8	148
3·3	27	19	24	21	25	32	20	12	8	5	12	7	212
3·4	23	15	44	34	66	57	36	22	17	5	13	14	346
3·5	59	67	68	56	81	74	74	25	14	26	27	11	582
3·6	103	79	94	90	48	42	80	76	51	42	35	30	770
3·7	78	36	30	40	25	21	29	73	82	59	45	43	561
3·8	33	24	18	18	19	17	20	34	61	85	93	43	465
3·9	15	17	13	16	11	6	15	12	22	67	55	22	271
4·0 and Over	70	47	38	36	55	42	45	54	96	141	112	43	779
Totals	454	359	370	355	374	344	363	337	390	460	413	227	4,446

Table 19 gives the frequencies for solids-not-fat. It has already been stated that the average figure for solids-not-fat for the year was 8·63 per cent., and the bulk of the individual figures for solids-not-fat are arranged closely around the average. Tables 18 and 19 bring out the further point that a much higher proportion of milks falls below the presumptive limit of 8·5 per cent. for solids-not-fat than falls below the presumptive limit of 3·0 per cent. for milk-fat.

Table 19
Composition of Milk : Frequencies
Solids-not-fat

Per cent.	Number of Samples												
	Jan.	Feb.	Mar.	Apl.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Under 7·8	1	4	2	0	1	2	0	0	1	2	8	0	21
7·8	5	1	2	0	0	1	0	0	0	0	0	0	9
7·9	0	0	1	2	0	1	0	0	0	0	0	1	5
8·0	0	1	1	0	1	1	0	1	0	0	0	1	6
8·1	2	2	2	4	6	1	1	0	1	1	2	1	23
8·2	10	4	8	5	2	3	0	5	5	3	2	1	48
8·3	22	10	11	12	11	2	9	10	3	4	5	3	102
8·4	40	42	43	32	28	14	16	8	21	16	24	21	305
8·5	157	133	133	142	74	51	75	73	50	51	74	80	1,093
8·6	109	80	87	66	72	96	116	86	112	111	138	57	1,130
8·7	59	40	36	55	101	100	83	80	104	136	84	28	906
8·8	31	24	20	16	41	43	23	38	48	71	41	20	416
8·9	11	11	10	15	20	19	27	24	28	32	19	7	223
9·0 and Over	7	7	14	6	17	10	13	12	17	33	16	7	159
Totals	454	359	370	355	374	344	363	337	390	460	413	227	4,446

Samples of Milk taken for Comparison

Part II of the Seventh Schedule of the Food and Drugs Act, 1955, contains certain provisions relating to the procuring of comparison samples of milk. Briefly, when a sample of milk is obtained from a vendor he must, if so requested, give to the Sampling Officer the name and address of the person from whom he, in turn, received the milk. The vendor may also within 60 hours of the sample being taken, serve on the Food and Drugs Authority a notice stating the name and address of the person from whom he received the milk and the time and place

of delivery to himself of milk from a corresponding milking, and requesting the Authority to procure, as soon as practicable, a sample of milk from a corresponding milking in course of transit or delivery to himself. The vendor shall have no right to request such a sample if the original sample procured from him was a mixture of milk produced on more than one dairy farm. In turn, the dairyman from whom such a sample of milk is procured in course of transit or delivery, may, within 60 hours after the sample was procured, serve on the Authority concerned a notice requesting that immediate steps be taken to procure a sample of milk from a corresponding milking of the cows. The person procuring this last sample shall be empowered to take such steps at the dairy as may be necessary to satisfy himself that the sample is a fair sample of the milk of the cows when properly and fully milked. It is the practice in the County for the Sampling Officers to take, in appropriate cases, follow-up and appeal-to-cow samples without a formal request being made by the vendor.

Appeal-to-Cow Samples

Appeal-to-cow samples, or, as they are sometimes called, " byre " samples, if the method of taking them is properly carried out in every detail, may be regarded in the light of a final appeal. The milking must be carefully supervised, it must be established that the same cows are milked, that it is the corresponding milking and the dairy equipment must be inspected to see that it is clean and dry. The results of analyses of samples procured in this way must be accepted as those pertaining to genuine milk. Appeal-to-cow samples serve at least two purposes. In the first place, they show, in cases where an unsatisfactory sample has been sold, the quality of the unadulterated milk given by the cows, and, secondly, extend our knowledge of the quality of the milk of different herds and of the natural variations which may occur in the composition of genuine milk.

It was with the former object in view that the practice of taking appeal-to-cow samples was instituted, *viz.*, to ascertain the composition of the milk given by the cows. It is now generally admitted that the composition of the milk from a herd of cows may occasionally fall below the limits laid down in the Sale of Milk Regulations, particularly at the morning milking. When such a milk is examined the question arises whether it is an unadulterated milk of poor quality, or a milk of normal composition which has been tampered with ; the appeal-to-cow sample is intended to help solve this problem.

In table 20 is given a list of appeal-to-cow samples, submitted by the County Sampling Officers during the year 1966 and also the results of analysis. Fifty-eight such samples are included, representing ten herds, the number of cows in the herds varying from four to forty-five.

In addition one appeal-to-cow sample was examined for an autonomous authority.

Analyses of Appeal-to-Cow Samples of Milk

Table 20

Number	Number of cows milked	Approx. yield gallons	Morning or Evening	Fat per cent.	Solids-not-fat per cent.	Freezing Point (Hortvet) °C	Taken for comparison with numbers	Observations
1151	1	1¼	E	4·15	8·23	−0·537		Low in solids-not-fat.
1152	1	1	E	3·60	8·86	−0·546		
1153	1	1½	E	4·55	8·89	−0·533		
1154	1	1¼	E	3·15	7·81	−0·543		Low in solids-not-fat.
1155	2	2¼	E	3·80	8·34	−0·544		Low in solids-not-fat.
1156	1	2½	E	3·25	7·87	−0·541		Low in solids-not-fat.
1157	1	2½	E	5·10	8·92	−0·541		Rich in fat and traces of blood-stained pus.
1158	1	¾	E	3·75	7·81	−0·545		Low in solids-not-fat and blood present.
1159	1	2½	E	4·40	8·28	−0·532	E.2764	Low in solids-not-fat.
1160	1	1	E	4·05	8·51	−0·535		
1161	1	1	E	2·55	7·03	−0·533		Poor in fat and low in solids-not-fat.
1162	1	1½	E	3·10	8·44	−0·532		Slightly low in solids-not-fat.
1163	1	2½	E	3·85	8·31	−0·529		Low in solids-not-fat and abnormally high freezing point.
1164	1	2¼	E	3·45	8·45	−0·528		Slightly low in solids-not fat and abnormally high freezing point.
1165	1	2¼	E	2·70	7·88	−0·545		Poor in fat and low in solids-not-fat.
1166	4	1	M	4·20	8·34	−0·531	E.2798	Low in solids-not-fat.
1183	22	20	M	3·00	8·70	−0·537	E.2932	
1184			M	3·22	8·60	−0·538		
603	6	8	M	3·72	8·60	−0·531	N.4061	
604	6	8	M	3·55	8·67	−0·537		

Table 20—*continued*

Number	Number of cows milked	Approx. yield gallons	Morning or Evening	Fat per cent.	Solids-not-fat per cent.	Freezing Point (Hortvet) °C	Taken for comparison with numbers	Observations
982		7	M	3·30	8·52	−0·538		
983	22	8	M	3·42	8·34	−0·534	E.3008	Low in solids-not-fat.
984		5	M	3·42	8·70	−0·547		
1207		10	E	4·08	8·80	−0·543		
1208	25	10	E	4·18	8·78	−0·546	C.2454 C.2455 & C.2459	
1209		2½	E	3·88	8·70	−0·543		
851		10	M	3·20	8·76	−0·542		
852		10	M	3·17	9·01	−0·540		
854		10	M	3·02	8·70	−0·538		
855	45	10	M	2·85	8·71	−0·544	C.2640	Poor in fat.
856		11½	M	3·42	9·12	−0·547	and	
857		10½	M	3·35	8·95	−0·544	C.2641	
858		10	M	3·80	9·00	−0·544		
859		6	M	3·95	8·73	−0·542		
605	1	1½	M	3·40	8·98	−0·530		
606	1	1½	M	3·50	8·70	−0·533		
607	1	1½	M	3·17	8·39	−0·528		Low in solids-not-fat and freezing point abnormally high.
608	1	2½	M	3·50	8·72	−0·539		
609	1	1½	M	2·42	9·50	−0·538		Poor in fat.
610	1	1½	M	4·20	9·06	−0·530		
611	1	1½	M	3·00	8·26	−0·533		Low in solids-not-fat.
612	1	1½	M	4·15	9·15	−0·539	N.5017	
613	1	1½	M	3·20	8·76	−0·536		
614	1	1½	M	1·80	8·78	−0·533		Poor in fat.
615	1	1½	M	1·82	9·16	−0·539		Poor in fat.
616	1	1½	M	3·60	8·74	−0·537		
617	1	1½	M	2·72	9·14	−0·535		Poor in fat.
618	1	1½	M	3·65	9·33	−0·527		Freezing point abnormally high.

Table 20—*continued*

Number	Number of cows milked	Approx. yield gallons	Morning or Evening	Fat per cent.	Solids-not-fat per cent.	Freezing Point (Hortvet) °C	Taken for comparison with numbers	Observations
619	1	1½	M	2·75	7·69	−0·526	N.5017	Poor in fat, low in solids-not-fat and freezing point abnormally high.
620	7	11	M	2·87	8·59	−0·533		Poor in fat.
705	2	3	M	4·27	8·78	−0·547	S.9345	
706	2	2½	M	5·62	8·41	−0·546		Rich in fat and slightly low in solids-not-fat.
707	1	½	M	5·22	8·51	−0·543		Rich in fat.
712	8	10	M	3·15	8·37	−0·545	E.4481	Low in solids-not-fat.
713	8	10	M	3·25	8·55	−0·540		
714	7	8	M	3·40	8·70	−0·539		
715	2	1½	M	4·20	8·00	−0·539		Low in solids-not-fat.
716	3	1½	M	4·20	8·42	−0·538		Slightly low in solids-not-fat.

An inspection of table 20 shows that the freezing point depression of the appeal-to-cow samples was determined in every case, and this gave valuable evidence of the authenticity of the samples. Although twenty of the appeal-to-cow samples were found to be low in solids-not-fat, in only four such instances were the freezing points of the samples above —0·530°C (Hortvet), the figure which is usually accepted as the highest freezing point normally given by milk free from extraneous water. The freezing point of the 58 appeal-to-cow samples varied between —0·526°C (Hortvet) to —0·547°C (Hortvet); the average figure being —0·538°C. (Hortvet). The average freezing points of appeal-to-cow samples examined during the five years 1961 to 1965 inclusive, were— 0·539°C., —0·538°C., —0·542°C., —0·539°C., and —0·539°C., respectively

Milk Supplied to Schools, Special Schools, Day Nurseries, Childrens Homes, Homes for the Aged, Mental Health Training Centres and Teachers Training Colleges.

The 400 samples of milk marked " Private " in table 3 were taken from consignments delivered to Schools, Special Schools, Day Nurseries, Childrens Homes, Homes for the Aged, Mental Health Training Centres and Teachers Training Colleges in the County. Twenty-five of these were adulterated, corresponding to an adulteration rate of 6·2 per cent. This figure is higher than the total milk adulteration rate for the County which was 4·7 per cent.

Of the 400 samples, 293 were taken at Schools, Special Schools and School Kitchens and twenty-four of these were found to be adulterated or otherwise unsatisfactory. Thirteen of these samples, all from the same source, contained traces of mineral oil varying from 0·0003 to 0·0021 per cent. and the dairy concerned was cautioned. Three other samples were found to contain small amounts of extraneous water and the dairies concerned were cautioned. A further three samples were found to be deficient in fat. Two of these samples only had small fat deficiencies and the producers were informed. The third sample was 23·3 per cent. deficient in fat but a further formal sample proved to be genuine. Two other samples contained small amounts of penicillin and in each instance the dairy concerned was cautioned. Another sample was incorrectly labelled and the dairy was informed. Finally, two other samples, each from a different source, were the subject of legal proceedings. One of these samples was found to contain an empty potato crisps plastic bag and the dairy was fined £75 and ordered to pay £19.10s.0d. costs. The remaining sample contained six fragments of broken glass and in this instance the dairy was fined £15 and ordered to pay £7.15s.0d. costs.

One hundred and seven samples were taken at Homes for the Aged, Day Nurseries, Childrens Homes, Teachers Training Colleges and at a Mental Health Training Centre. With one exception all these samples were found to be satisfactory. The unsatisfactory sample contained a very small amount of extraneous water (0·6 per cent.) and the dairy concerned was cautioned.

Samples of Milk deficient in solids-not-fat but genuine

Attention has already been drawn in the sections of this Report dealing with the "Standards of quality for milk," "Composition of Milk : Frequencies" and "appeal-to-cow" samples, to the fact that milk as it comes from the cow is not always of such quality as to comply with the minimum presumptive limits of 3·0 per cent. for milk-fat and 8·5 per cent. for solids-not-fat, of the Sale of Milk Regulations, 1939 In order to decide whether such samples submitted under the Food and Drugs Act were in fact as given by the cow, and therefore genuine, it is still necessary in the case of presumed fat deficiencies to make an actual comparison with an "appeal-to-cow" sample from a corresponding milking. Formerly, this was also the only means by which it could be decided whether a sample low in solids-not-fat was of naturally poor quality or whether it had been adulterated by the addition of water. For the past 35 years or so, however, it has been possible by submitting the sample to the Hortvet freezing point test for the Analyst to obtain additional evidence that a deficiency in solids-not-fat was due to the presence of extraneous water or, alternatively, that it was due to natural causes.

In the section of the revised Ministry of Health memorandum 36/Foods (1939), dealing with Public Analysts' quarterly reports, it is laid down that in the case of samples below the presumptive limits of the Sale of Milk Regulations, the report should show whether they were adjudged genuine by the Analyst on other grounds. It is now the normal procedure to submit all samples low in solids-not-fat to the Hortvet freezing point test and to include in the quarterly reports a table giving details of such samples which satisfactorily pass the test.

During the year under review, 419 County samples of milk were found to be poor in solids-not-fat, but were adjudged genuine by the Hortvet freezing point test. This figure corresponds to 9·4 per cent. of the total milk samples (including "appeal-to-cow") submitted by County Sampling Officers. These poor quality milks were distributed over the year as follows :—167 in the March quarter, 107 in the June quarter, 71 in the September quarter and 74 in the December quarter. The samples were not, therefore, confined to any particular season of the year, although the greatest number was obtained during the winter and spring and the lowest in the latter half of the year. The lowest figure for solids-not-fat shown by any of these samples was 7·03 per cent., the next lowest being 7·81 per cent.

Each year it is usual to find an appreciable number of milk samples which are poor in solids-not-fat but are nevertheless adjudged genuine as the result of applying the Hortvet freezing point test. The number of such samples, *viz.*, 9·4 per cent., submitted during the year under review is higher by 0·6 than for the year 1965, when the figure was 8·8 per cent. In the five years preceding the year 1965 the percentages of milk samples coming under this heading varied from 6·7 to 19·6 per cent.

It will be noted that the percentage of milk samples poor in solids-not-fat but genuine by the freezing point test for the year 1966, *viz*:., 9·4 per cent., is rather high when compared with the percentage of adulterated milk samples for the same year, *viz.*, 4·7 per cent. The difference is even more striking when it is considered that the last mentioned figure includes all samples containing extraneous water and all samples containing less than 3·0 per cent. milk-fat whether or not, in the latter instance, the corresponding appeal-to-cow samples indicated that the fat deficiencies were actually due to abstraction or merely to natural causes.

The relatively high proportion of milks found to be naturally deficient in solids-not-fat, which is by no means confined to Lancashire, is undoubtedly one of the factors which influenced the Government to appoint a Committee in the year 1958 to consider the composition of milk. (The findings of this Committee are referred to in the section of this report dealing with " The Standards of Quality for Milk.")

Antibiotics in Milk

Samples of ex-farm milk have been tested in the County Laboratory for the presence of penicillin and other antibiotics since May, 1962. The Milk Hygiene Sub-Committee of the Milk and Milk Products Technical Advisory Committee appointed by the Government published on the 30th May, 1963, a report on Antibiotics in Milk in Great Britain. This report was the result of a survey carried out in the year 1961 and it indicated that 11 per cent. of the samples of milk taken in England and Wales contained penicillin or other antibiotics but 4·4 per cent. contained less than 0·04 unit per ml. of penicillin. This last figure is usually regarded as the danger limit in cheese making at or above which partial inhibition of cheese starters may occur. The presence of antibiotics, particularly penicillin, in milk mainly stems, of course, from the use of these substances in the treatment of mastitis, although farmers are advised to keep back milk from treated animals for 48 hours or longer depending on the excretion time of the preparation.

The testing of ex-farm milks for antibiotics has continued and from the end of May, 1963, all milk samples have been tested including heat treated milks and Channel Islands milks. The year under review is, therefore, the third full year that testing has been carried out on all milk samples. The test at first used was a plate culture method using spores of B-subtilis which was capable of detecting levels of the order of 0·05 unit per ml. but in October, 1963, the T.T.C. (2 : 3 : 5 triphenyltetrazolium chloride) test was adopted and this is capable of detecting levels as low as 0·01 unit per ml. This latter test depends on the fact that T.T.C. is changed from its colourless form into red formazane in the presence of actively metabolising streptococcus thermophilus B.C. In the presence of penicillin or other antibiotic which inhibits the growth of this organism either no red colour or only a faint colour develops depending on the amount of antibiotic present and the intensity of colour can be matched against standards. It is possible to confirm whether any inhibition of growth is due specifically to the presence of penicillin by carrying out another test in the presence of penicillinase.

On the 19th August, 1964, the Ministry of Agriculture, Fisheries and Food sent a circular letter, No. FSH 15/64, on antibiotics in milk to Food and Drugs Authorities. This drew attention to the fact that some dairies were already testing incoming milks from farms for antibiotics and that this would be extended to more dairies as soon as possible. The tests provisionally recommended in 1964 for use in dairies were a Modified T.T.C. test and a Reverse-Phase Disc Assay Method (Kosikowski). The former test requires 2·5 mls. of sample while the full T.T.C. test uses 5 mls. of sample, the latter is, therefore, more sensitive. The Reverse-Phase Disc Assay uses agar plates seeded with Bacillus subtilis spores and special nutrient discs which are dipped into the samples, then placed on the plates and incubated. This method is similar to that originally used in the County Laboratory except that in the latter method the nutrients were added directly to the agar plates. Both the Modified T.T.C. test and the Reverse-Phase Disc Assay are capable of detecting penicillin down to a level of about 0·05 unit per ml. and are also sensitive to other inhibiting substances. As described for use in dairies both tests are only pass or fail tests, i.e. the amounts of antibiotics present in the samples are not reported. Although the circular letter suggests that Public Analysts should use the same tests, the County Laboratory is continuing to use the full T.T.C. test which, as already mentioned, has greater sensitivity and which enables a figure for the amount of antibiotic present in a sample to be returned. This last would appear particularly desirable in relation to official action as it is then possible to say whether or not a relatively large amount of penicillin was present in the sample. Since the 20th May, 1964, however, samples have only been reported as positive when the results have indicated the presence of an amount of penicillin or other antibiotic of the order of 0·05 unit per ml. or more.

In August, 1965 the Advisory Committee of the Ministry of Agriculture, Fisheries and Food withdrew its previous recommendation that the Kosikowski test should be one of the tests used by dairies to test incoming milks from farms, because of difficulties in obtaining satisfactory supplies of materials for that test. It was, however, confirmed that a modified T.T.C. test would be used by dairies and that general testing should be in operation towards the end of the year 1965 although a penalty scheme would not be introduced by the Milk Marketing Board until satisfactory experience of the testing procedure had been obtained. In some instances at least a penalty scheme dated from April of the year under review. As stated above, the County Laboratory is continuing to use the full quantitative T.T.C. test in regard to samples submitted under the Food and Drugs Act and before any legal action is contemplated in regard to an unsatisfactory sample confirmation of the result is obtained by also submitting the sample to the plate culture test previously in general use in the laboratory.

During the year under review 4,909 samples of milk (including Channel Islands Milk) taken in the County were tested for antibiotics and 28 samples (0·6 per cent.) gave positive results all of which were due to penicillin. These samples included 2,647 samples of untreated milk of which 21 (0·8 per cent.) reacted positive, and 2,262 samples of heat treated milk of which 7 (0·3 per cent.) were positive. The highest amount of penicillin found was 2·5 units per ml. in a sample of untreated milk ; the highest amount found in a sample of heat treated milk being 0·08 unit per ml. The average amounts of antibiotic found in all samples containing it was 0·13 unit per ml. in all milks, 0·15 unit per ml. in untreated milks and 0·07 unit per ml. in heat treated milks. During the year 1965, 1·6 per cent, of the milk samples gave positive results for antibiotics ; the average amount of antibiotic found in that year in all samples containing it was 0·29 unit per ml. in all milks, 0·36 unit per ml. in untreated milks and 0·09 unit per ml. in heat treated milks. It will be seen that the amounts found in heat treated milks are very much lower than in untreated milks ; this is due to the bulking of milk from different sources by dairies before heat treatment.

During the year under review legal proceedings were instituted in respect of seven County samples of milk found to contain penicillin which had been produced on five different farms. The retail producer of Samples Nos. N.3897 and N.3898 which contained 2·5 units and 0·075 unit of penicillin per ml. respectively was fined £5.0s.0d. together with £9.4s.0d. costs. The retail producer of Samples Nos. S.7979 and S.7980 which contained 0·45 unit and 0·06 unit of penicillin per ml. respectively was fined £12.0s.0d. and £17.12s.0d. costs. The farmer responsible for bottling milk Sample No. S.9532 containing 0·25 unit of penicillin per

ml. was fined £10. 0s. 0d. and £8. 16s. 0d. costs. The retail producer of Sample No. N.5520 which contained 0.30 unit of penicillin per ml. was given a conditional discharge but ordered to pay £5. 13s. 0d. costs. The last prosecution was in respect of a sample of Channel Islands milk, No. C.3132, which was found to contain 0·10 unit of penicillin per ml. and the retail producer was fined £5. 0s. 0d. and £9. 17s. 0d. costs.

In addition to the County Samples, 1,156 samples of milk submitted by autonomous Food and Drugs Authorities were also tested for the presence of antibiotics and of these 15 (1·3 per cent.) were positive. Legal proceedings were instituted against two producers by one autonomous Food and Drugs Authority in respect of penicillin in milk. The first case involved three samples containing 0·85, 0·65 and 0·07 unit of penicillin per ml. respectively and the producer was fined £5. 0s. 0d. The second prosecution also involved three samples containing 1·5, 0·06 and 0·06 unit of penicillin per ml. respectively and in this case also the producer was fined £5. 0s. 0d.

In all instances both in respect of County samples and those submitted by autonomous Food and Drugs Authorities where antibiotic was found, but which were not the subject of legal proceedings, the results of the test were brought to the attention of the dairy or, in the case of ex-farm milks, of the farmer and the Milk Marketing Board.

Adulteration of Articles other than Milk

During the year under review there were examined for the County 3,787 samples other than milk ; of these 229 were reported against. This corresponds to an adulteration rate of 6·0 per cent., which is lower than the figure obtained in the year 1965, when it was 6·3 per cent. The percentage of adulteration in articles other than milk for the year under review, was higher than that for milk, *viz.*, 4·7 per cent. An examination of tables 3 and 21 shows that sausages, samples containing extraneous matter or insects, and samples whose labels did not conform to the requirements of the Labelling of Food Order contributed especially to the overall adulteration rate. Of the 229 unsatisfactory samples, 28 consisted of sausage, 36 were incorrectly labelled and 91 contained extraneous matter or insects. These three classes of samples, therefore, accounted for 4·1 per cent. of the total of 6·0 per cent. adulterated.

Table 21 gives a list of the articles other than milk submitted by County Sampling Officers which were found to be unsatisfactory with particulars of the type of adulteration and the action taken.

Samples other than Milk, adulterated or otherwise giving rise to irregularity

Table 21

No. of Sample	Description	Formal Informal or Private	Nature of Adulteration or Irregularity	Observations
E.2595	Sweet	Informal	Contained a piece of iron wire approximately 32millimetres long and 1·1 millimetres in diameter, weighing 0·25 gramme.	Section 2, Food and Drugs Act, 1955. Fined £2 and £7.15.0. costs.
S.7472	Jersey Milk	Formal	Contained 0·08 I.U. penicillin per ml.	Producer cautioned and Milk Marketing Board informed.
S.7478	Pork Pie	Informal	Meat content of pie only 23·3 per cent. Recommended minimum meat content 25·0 per cent.	No action advised.
E.2629	Channel Islands Milk	Informal	Cap incorrectly embossed "T.T." otherwise genuine.	Dairy informed.
N.3784	Channel Islands Milk	Formal	Fat content 3·70 per cent. Deficient 7·5 per cent. fat.	Producer cautioned.
E.2674	Bread	Informal	Contained ten fragments of absorbent cotton lint, containing 0·26 per cent. of boric acid, weighing in all 0·80 gramme.	Sections 2 and 113 (3) Food and Drugs Act, 1955. Fined £10 and £7.15.0. costs.
E.9870	Chicken Spread	Informal	Contained part of a feather measuring 32 millimetres by 3 millimetres.	Packers cautioned and complainant informed.
E.9872	Portion of a Meal	Informal	Sample consisted of 3·8 grammes meat, some of which was stained blue-green with a water insoluble non-permitted but unidentified dye.	A check sample of the same brand of canned meat product was satisfactory.
E.2706	Pork Sausage	Informal	Meat content only 62·5 per cent. Contained 45 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor cautioned.

Table 21—*continued.*

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
E.2699	Bread	Informal	Contained unrisen dough discoloured with edible fat and atmospheric dust which stained approximately 3·5 grammes of breadcrumb and affected seven slices of the loaf.	Bakery cautioned and complainant informed.
E.2714	Beef Sausage	Informal	Contained 290 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor cautioned.
E.2715	Pork Sausage	Informal	Meat content only 57·5 per cent. Poor in meat content. Contained 200 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor cautioned.
E.2759	Sulphonamide Suspension	Informal	Total content of sulphonamides only 442 milligrams per teaspoonful (5 mls.). Should be 500 milligrams per teaspoonful.	Pharmacist interviewed.
E.2771	Portion of Flour Cake Sandwich	Informal	Part of a damaged unidentified moth larva 9 millimetres long submitted separately. No parts of the insect were found embedded in the crust of the flour cake.	Bakery and complainant informed.
E.2784	Mincemeat	Informal	Fat content only 2·0 per cent. Should be not less than 2·5 per cent.	Manufacturers no longer produce this commodity.
E.2791	Beef Sausage	Informal	Contained 192 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor cautioned.
S.7629	Jersey Milk	Formal	Fat content 3·70 per cent. Deficient 7·5 per cent fat.	Producer cautioned Further sample. genuine.
C.2031	Cheese	Informal	Contained one human cranial hair with root measuring 48 millimetres in length.	Vendor cautioned and complainant informed.

Table 21—*continued.*

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
C.2032	Brown Sliced Loaf (part of)	Informal	Contained 2 pellets of iron oxide and very finely divided iron held together with approximately one-sixth its weight of mineral oil weighing, in all, 0·095 gramme.	Bakery cautioned and complainant informed.
N.3962	Beef Sausage	Informal	Meat content only 47·5 per cent.	Poor in meat content.
—	Milk, Modified, Dried, Full Cream	Informal	Sample contained traces of mould filaments from a mould of penicillium type. Date stamp on base of tin showed that the sample was within three months of its expiry date.	Complainant and Child Welfare Centre informed.
E.2870	Butter	Informal	Moisture content 16·2 per cent. Should not be greater than 16·0 per cent.	Packers communicated with.
S.7811	Bread	Informal	Contained 9·65 grammes of breadcrumb discoloured almost black with 0·17 gramme of mineral oil and 0·017 gramme of iron (expressed as Fe) and containing a small amount of cotton fluff.	Sections 2 and 113 (3), Food and Drugs Act, 1955. Fined £25 and £9.17.0 costs.
N.3994	Pork Sausage	Informal	Contained 230 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor cautioned.
E.2894	Corned Beef, Canned	Informal	Contained one dead female tick measuring approximately $8 \times 5 \cdot 5 \times 1 \cdot 5$ millimetres and weighing 27 milligrams.	Manufacturer cautioned.
N.4025	Jersey Milk	Formal	Fat content 3·70 per cent. Deficient 7·5 per cent. fat.	Producer cautioned.
N.4039	Condensed Vegetable Soup, opened can	Informal	Contained a dead woodlouse 10 millimetres in length. The woodlouse had not been heated (processed).	Complainant informed.
C.1806	Mixed Vegetables, Canned	Informal	No beans present yet beans included in list of ingredients on label.	No action advised.
C.1810	Junior Aspirin Tablets	Informal	Tablets were sticking together and Free Salicylic Acid was approximately three times the maximum limit for Aspirin Tablets, B.P.	Remainder of stock withdrawn from sale.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
C.1820	Channel Islands Milk	Informal	Contained 0·08 I.U. penicillin per ml.	Dairy informed.
E.2879	Soft Drink Crystals	Informal	Contained a frothing agent. List of ingredients on label includes " Saponin " which is a frothing agent. " Saponin " is an undesirable ingredient for internal use.	Manufacturers communicated with.
S.7896	Jersey Milk	Formal	Contained 0·10 I.U. penicillin per ml.	Producer cautioned and Milk Marketing Board informed.
E.2959	Chocolate Biscuit	Informal	Contained a crushed beetle larva 3·5 millimetres long. The biscuit bore evidence of insect damage but the wrapper was also damaged. The larva had not been heated.	Complainant informed and matter referred to appropriate local authority for action.
N.4086	Channel Islands Milk	Informal	Contained 0·05 I.U. penicillin per ml.	Dairy informed.
S.7918	Jersey Milk	Formal	Fat content 3·95 per cent. Deficient 1·2 per cent. fat.	Producer cautioned.
E.3007	Cherry Fruit Cake	Informal	Submitted separately 4 fragments of dyed cherry stone weighing in all 0·25 gramme.	Bakery cautioned and complainant informed.
S.7953	Jersey Milk	Formal	Contained 0·12 I.U. penicillin per ml.	Producer cautioned and Milk Marketing Board informed.
S.7963	Pure Butter Eccles Cakes	Informal	Contained 11·6 per cent. of fat of which only 8·4 per cent. consisted of butter fat. When labelled " Pure butter Eccles Cakes " the added fat should consist entirely of butter fat.	Bakery communicated with.
S.7966	Pork Sausage	Informal	Contained 130 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor cautioned.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
E.3036	Bread	Private	Contained 0·5 per cent. of mineral oil. Should not contain more than 0·2 per cent. (from contact with greased surfaces with which the food must necessarily come in contact).	Bakery cautioned.
N.4177	Pork Sausage	Informal	Meat content only 63·0 cent.	Poor in meat content.
S.8007	Pork Sausage	Informal	Contained 227 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor cautioned.
S.7932	Beef Sausage	Informal	Contained 360 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor cautioned.
S.7939	Hot Dog Skinless Sausages, Canned	Informal	50·0 per cent. of contents of the can consisted of brine. The words "packed in brine" should appear in close proximity to the name of the product.	Importers communicated with.
1/66	Bread (portion of)	Informal	Contained 0·5 gramme of crumb discoloured with brown overheated dough. No mineral oil, iron or other foreign matter detected.	Bakery and complainant informed.
S.7949	Baby Food (Bone and Vegetables)	Informal	Vegetables present in greater amount than bone. Name of the food should be "Vegetables and Bone" and not "Bone and Vegetables" as printed on labels.	Manufacturers communicated with.
N.5512	Stewed Fruit	Private	Contained 12 dead ants (workers of the Common Black Ant), one dead unidentified moth larva 3 millimetres long and part of one small parasitic fly 2·5 millimetres long.	Remainder of stock withdrawn.
C.2055	Tomato Juice Cocktail, Bottled	Informal	The surface of the sample was covered with a matt of fungus Mycelium weighing 0·195 gramme (moist weight).	Manufacturers communicated with.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
N.4196	Part loaf of Bread	Informal	Contained 0·5 gramme of somewhat dry dough rich in gluten.	Complainant informed and bakery notified.
S.8042	Buttercake Biscuits	Informal	Contained 24·9 per cent. of fat of which only 14·2 per cent. consisted of butter fat. When labelled "Buttercake" without any qualification concerning the amount of butter present, the added fat should consist entirely of butter fat.	Manufacturers communicated with.
S.8060	Pork Sausage	Informal	Contained 215 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor cautioned.
E.9875	Lemonade	Formal	Consisted of Sodium Hydroxide (Caustic Soda) solution containing 19·9 per cent. by weight of NaOH	Section 2, Food and Drugs Act, 1955. Fined £25 and £9.17.0. costs.
E.3096	Cream of Chicken Soup, canned	Informal	Total fat content 2·2 per cent. of which only half consisted of butter fat. Code of Practice for cream soups requires a total fat content of not less than 3·0 per cent. and a butter fat content of not less than 1·5 per cent. when mixed fat is present.	Manufacturer taking steps to prevent a recurrence and remainder of stock withdrawn from sale.
N.4236	Meat and Potato Pies	Informal	Meat content of pies only 5·3 per cent. Recommended minimum meat content 12·5 per cent.	Manufacturer communicated with.
S.8072	Flour Confectionery (Pure Butter Eccles Cakes)	Informal	Contained 15·1 per cent. total fat of which only 10·0 per cent. consisted of butter fat.	Bakery communicated with. Taking steps to prevent a recurrence.
N.4263	Fish, Canned	Informal	Contained 50 parts per million formaldehyde.	No action advised.
E.3132	Pork Sausage	Informal	Meat content 64·0 per cent.	Slightly low in meat content.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
S.8917	Flour, Plain	Private	Iron content 1·2 milligrams, Vitamin B_1 content 0·16 milligrams, Nicotinic Acid content 1·38 milligrams, all per 100 grammes. Should be not less than 1·65 milligrams, 0·24 milligrams and 1·6 milligrams, all per 100 grammes respectively.	Millers taking steps to prevent a recurrence.
S.8918	Pork Sausage	Private	Contained 160 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor cautioned.
S.8114	Flour Confectionery (Dairy Almond Cake)	Informal	Contained 5·0 per cent. skimmed milk powder calculated on the dry cake but no milk fat was present. The use of the word " dairy " is undesirable when no whole milk solids present.	Bakery communicated with.
C.2147	Travel Sickness Tablets	Informal	Not labelled with the special cautionary wording.	Pharmacist taking steps to prevent a recurrence.
C.2150	Borax	Informal	Contained 128·0 per cent. of borax calculated as $No_2B_4O_7$. $10H_2O$. B.P. maximum limit 103·0 per cent.	No action advised.
C.2170	Sweets (Chocolate Centred Toffees)	Informal	5 papers contained 5·0 per cent copper and 1·0 per cent. zinc from a " gilt " printed design. 11 sweets contained an average of 15 parts per million copper and 12 parts per million zinc visible on the surface as " gilt " particles. Although not excessive in the sweets in this instance, the use of brass containing printing is undesirable in connection with food.	Manufacturer communicated with and complainant informed.
S.8147	Travel Sickness Tablets	Informal	Not labelled with the special cautionary wording.	Pharmacist taking steps to prevent a recurrence.
E.3214	Hamburger, uncooked	Informal	Meat content 73·5 per cent.	Poor in meat content.

Table 21—*continued.*

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
E.3219	Slimming Biscuits	Informal	Contained 45 live beetles and 3 dead beetles each approximately 3·5 millimetres in length together with one fully grown live beetle larva approximately 4 millimetres in length; all were of the species Ptinus tectus.	Section 2, Food and Drugs Act, 1955. Fined £25 and £13 costs.
S.8163	Ice Lollies	Informal	Contained 0·016 per cent. of saccharin without declaration in list of ingredients	Manufacturer communicated with.
S.8171	Grapefruit Segments, canned	Informal	1. Can blown (contained 17 ccs. of hydrogen). 2. Contained 315 parts per million Tin. Maximum recommended limit for tin 250 parts per million.	See sample No. S.8191.
S.8191	Grapefruit Segments, opened can	Informal	The insect which was submitted with the sample was a red rust flour beetle. The sample contained a large number of cluster crystals of the glycoside naringin which is natural to grapefruit. Appearance of old stock.	Remainder of stock withdrawn from sale and and complainant informed.
C.2195	Junior Aspirin Tablets	Informal	Free salicylic acid approximately two and a half times the maximum limit for Aspirin Tablets B.P.	Remainder of stock withdrawn from sale.
E.3247	Meat, Potted	Informal	Meat content only 82·0 per cent. Recommended meat content for "Potted Meat" 95·0 per cent.	Vendor interviewed.
C.2249	Sweets	Informal	Contained 21·0 per cent. of non-milk fat and 6·0 per cent. of skimmed milk solids but no milk fat. To justify the name "Super Kreem Toffee" it should also contain at least 4·0 per cent. of milk fat.	Manufacturer communicated with.
N.4426	Cheese Spread with Shrimps	Informal	Fat content of the cheese spread (after allowing for 6·0 per cent. of shrimp) only 19·0 per cent. Should be not less than 20·0 per cent.	Manufacturers taking steps to prevent a recurrence.

Table 21—continued.

No. of Sample	Description	Formal Informal or Private	Nature of Adulteration or Irregularity	Observations
S.8227	Standardized Senna Tablets	Informal	Tube labelled "50 Senoket Standardized Senna Tablets" but contained only 43.	Vendor taking steps to prevent a recurrence.
S.8253	Travel Sickness Tablets	Informal	Not labelled with the special cautionary wording.	Pharmacist informed.
S.8279	Ice Lollies	Informal	Label bore the misprint "Alginade" for Alginate.	Manufacturer agreed to amend misprint.
C.2058	Milk, Condensed, Full Cream, unsweetened	Informal	Equivalent pints in can only 0·74 (declared to contain ¾ pints of milk.)	No action advised.
C.2243	Glucose Sweets	Informal	Contained 67·5 per cent. Sucrose and 26·5 per cent. Glucose syrup solids yet claimed "Glucose stick, a source of Energy" and "Pure Glucose Products. ." Sucrose was the main ingredient and the other ingredient was not pure glucose (dextrose) but glucose syrup solids. Reference to Glucose and the claims as a source of energy should be deleted from label.	Manufacturer communicated with and agreed to amend label.
C.2337	Soup Mixture, dry	Informal	The sample was infested with mites.	Remainder of stock surrendered and destroyed.
E.9876	Potato Sticks	Informal	Contained 7¼ grammes of overheated potato "crumb". Otherwise genuine.	Manufacturer informed.
S.8365	Meat and Potato Pasties	Informal	Meat content of pasties only 10·2 per cent. Recommended minimum meat content 12·5 per cent.	Poor in meat content.
S.8366	Meat and Potato Pies	Informal	Meat content of pies only 10·6 per cent. Recommended minimum meat content 12·5 per cent.	Poor in meat content.
S.8368	Meat and Potato Pies	Informal	Meat content of pies only 10·0 per cent. Recommended minimum meat content 12·5 per cent.	Poor in meat content.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
S.8369	Meat and Potato Pies	Informal	Meat content of pies only 6·5 per cent. Recommended minimum meat content content 12·5 per cent.	Manufacturer interviewed.
S.8371	Meat and Potato Pies	Informal	Meat content of pies only 10·8 per cent. Recommended minimum meat content 12·5 per cent.	Poor in meat content.
S.8372	Meat and Potato Pies	Informal	Meat content of pies only 3·5 per cent. Recommended minimum meat content 12·5 per cent.	Manufacturer interviewed.
E.3326	Pickles	Informal	Contained a piece of jute string which measured 5 centimetres long and weighed 8 milligrams.	Manufacturer communicated with.
E.3331	Soft Drink Crystals	Informal	Contained a frothing agent. List of ingredients on label included "Saponin" which is a frothing agent. Saponin is an undesirable ingredient for internal use.	Manufacturer communicated with.
S.8386	Pancake and Batter Mixture	Informal	Dried egg present in smaller amount than skimmed milk powder yet listed before skimmed milk powder in declaration of ingredients.	Correct labels now in use.
C.2391	Tomato Paste	Informal	Contained 700 parts per million tin. Maximum recommended limit 250 parts per million.	No further stock available.
E.3360	Flour Confectionery (part of a Fruit Tart)	Informal	The sample was infested with mould.	Section 2, Food and Drugs Act, 1955. Fined £5 and £12.16.0 costs.
C.2423	Boracic and Chlorinated Cresols Ointment	Informal	Chlorinated Cresols found only 0·14 per cent. compared with 0·25 per cent. declared.	Manufacturer communicated with.
N.4551	Pork Sausage	Informal	Contained 150 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor cautioned.
S.8443	Channel Islands Milk	Formal	Fat content only 3·80 per cent. Deficient 5·0 per cent. fat.	Producer cautioned. Further sample genuine.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
C.2434	Ice-cream	Informal	Milk solids-not-fat content only 6·5 per cent. Should be not less than 7·5 per cent.	Vendor cautioned.
E.3459	Meat, Potted	Informal	Total meat content 60·8 per cent. Consisted of sliced beef brawn and not "Potted Meat". Recommended meat content of Potted Meat 95·0 per cent.	Manufacturer communicated with.
C.2444	Dairy Ice-Cream	Informal	Milk fat content only 4·9 per cent. Should be not less than 5·0 per cent.	No action advised.
E.3421	Channel Islands Milk	Formal	Fat content only 3·40 per cent. Deficient 15·0 per cent. fat.	Producer cautioned.
N.4579	Channel Islands Milk	Informal	Fat content only 3·70 per cent. Deficient 7·5 per cent. fat.	Producer cautioned.
C.2517	Ice-Cream	Informal	Milk solids other than fat content only 6·9 per cent. Should be not less than 7·5 per cent.	Vendor cautioned.
E.3468	Pickles	Informal	Contained 430 parts per million of sulphite preservative (expressed as sulphur dioxide). Maximum permitted limit 100 parts per million.	See sample No. E. 3538
E.3475	Flour, Plain	Informal	Creta praeparata only 132 milligrams per 100 grammes (limits 235–390 milligrams per 100 grammes) and iron, nicotinic acid and Vitamin B_1 all approximately 10 per cent. lower than the minimum limit.	Millers informed.
C.2545	Tomato Puree, Canned	Informal	Tin content 630 parts per million. Maximum recommended limit 250 parts per million.	Remainder of stock withdrawn from sale.
S.8528	Fruit, Fresh	Informal	Sample consisted of 12½ ounces of gooseberries of which 1½ ounces were affected by grey mould.	Vendor interviewed and cautioned.
C.2466	Shandy (Bottled)	Informal	Proof spirit content only 0·95 per cent. Poor in proof spirit content.	No action advised.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
E.3491	Bread, part loaf	Informal	Contained parts of the filter tip of a smoked cigarette, the parts weighing in all 0·10 gramme.	Section 2, Food and Drugs Act, 1955. Fined £20 and £20 costs.
C.2477	Salmon, Opened Can	Informal	Sample contained crystals of "struvite" (ammonium magnesium phosphate) but no glass.	Complainant informed.
N.4649	Pork Sausage	Private	Contained 140 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Contractor communicated with.
S.8546	Ice Lollies	Informal	Sugar present in greater quantity than fruit juice yet listed after fruit juice in list of ingredients. Sample also contained saccharin which was not included in list of ingredients.	Manufacturer communicated with.
S.8585	Beef Sausage	Informal	Contained 250 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor interviewed and cautioned.
E.3527	Butter	Informal	3 grammes of the butter were discoloured with a mould of a penicillium species.	Complainant informed and vendor cautioned.
E.3538	Pickles	Formal	Contained 300 parts per million sulphur dioxide, i.e. 200 parts per million in excess of statutory limit. Also no declaration of presence of preservative on label or exhibited.	Same source as sample No. E3468 See also sample sample No. E.3544.
E.3544	Pickles	Formal	Contained 360 parts per million sulphur dioxide, i.e. 260 parts per million in excess of the statutory limit. Also no declaration of the presence of preservative on label or exhibited.	Same source as Samples No.'s E.3468 and E.3538 Regulations 3 and 5 of the Preservatives in Food Regulations, 1962 and Section 113(3) Food and Drugs Act, 1955. Fined £10 and £7.15.0. costs.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
E.3557	Baking Powder	Informal	Available carbon dioxide only 6·6 per cent. Minimum standard 8·0 per cent.	See sample No. E.3617
S.8627	Vegetables, Dried (Peas)	Informal	Steeping tablet contained two-thirds sodium bicarbonate and one-third sodium carbonate. Order of ingredients on outer wrapper in wrong order although correct on the tablet wrapper.	Packers agreed to state correct order of ingredients.
C.2628	Ice-Cream	Informal	Milk solids other than fat content only 6·2 per cent. Should be not less than 7·5 per cent.	Vendor cautioned.
C.2604	Custard Powder	Informal	Box contained only three one ounce packets of custard powder although labelled "contains 5 separate pint packets each net weight one ounce."	Vendor communicated with.
C.2641	Channel Islands Milk	Formal	Deficient of 4·1 per cent, solids-not-fat; freezing point indicated 7·9 per cent. extraneous water.	Section 32 (3) Food and Drugs Act, 1955. Fined £5 and £5.13.0d. costs. Same source as Sample of Milk, No. C.2640.
N.4707	Chicken Fillets in in Jelly, Canned	Informal	Chicken content only 78·0 per cent. Recommended minimum meat content 80·0 per cent.	No action advised.
E.3617	Baking Powder	Informal	Available carbon dioxide only 6·6 per cent. Minimum standard 8·0 per cent.	Same manufacturer as Sample No. E.3557 Manufacturer communicated with.
N.9156	Breakfast Cereal and Milk	Informal	Contained six fragments of white paper weighting in all 0·15 gramme. The paper was similar to that of the white paper inner wrappers of the carton of cereal.	Complainant informed.
C.2661	Potato Crisps, Starch Reduced	Informal	Starch on fat free 79·3 per cent. When allowance was made for the fat content there was no evidence that the crisps were starch reduced.	Packers communicated with.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
E.3618	Boracic Acid Powder B.P.	Informal	Boric Acid only 98·2 per cent. Should contain not less than 99·5 per cent. Boric Acid.	Pharmacy communicated with.
E.3625	Flour, Plain	Informal	Creta praeparata only 219 milligrams per 100 grammes (limits 235–390 milligrams per 100 grammes.)	No action advised.
E3669	Vegetables, Fresh (Lettuce)	Informal	Contained the fungicide Maneb 3·1 parts per million, mainly on the outer leaves (outer leaves only, 31 parts per million).	Same Grower. Suggested lettuce could be sold after removing outer leaves.
E.3670	Vegetables, Fresh (Lettuce)	Informal	Contained the fungicide Maneb 1·5 parts per million mainly on the outer leaves.	
S.8778	Colouring Material	Informal	Label did not bear any list of ingredients.	Amended labels now in use.
E.3711	Meat, Canned	Informal	Both cans showed slight yellowish discolouration of surface meat adjacent to the can seam and the opening strip, otherwise genuine.	Same importers. Importers communicated with.
E.3712	Meat, Canned	Informal		
E.3737	Baked Beans with Tomato Sauce, Canned	Informal	Sample found to consist of a brand of cat food.	Section 2, Food and Drugs Act, 1955. Fined £10 and £7.15.0d. costs.
E.9878	Corned Beef (Opened Tin)	Informal	Contained the abdomen of a black ground beetle weighing 29 milligrams.	Importers taking steps to prevent a recurrence and complainant informed.
N.4855	Bread, part loaf	Informal	Contained 0·55 gramme of dough discoloured with 0·52 milligram of copper and 0·3 milligram of iron.	Bakers cautioned and complainant informed.
C.2708	Noodles and Meat with Sauce, Canned	Informal	Meat content not greater than 32·0 per cent. Prominently labelled "BEEF MILANO" and less conspicuously "Noodles and Beef in a Continental Sauce". Poor in meat content.	No action advised.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
N.4856	Beer, Opened Bottle	Informal	Contained a loose crescent shaped matt of fungus mycelium weighing 0·19 gramme (moist).	Brewery cautioned and taking steps to prevent a recurrence and complainant informed.
C.2713	Part Swiss Roll	Informal	Contained 26 dead black ants.	Retailer cautioned.
E.378	Flour, Plain	Informal	Creta praeparata only 188 milligrams per 100 grammes (limits 235–390 milligrams per 100 grammes).	No action advised.
C.2757	Flavouring Material	Informal	Contents of bottle only ¼ fluid ounce compared with ½ fluid ounce declared.	Weights and Measures Section informed.
C.2749	Ice-Cream	Informal	Milk solids other than fat content only 7.0 per cent. Should be not less than 7·5 per cent.	Manufacturer cautioned.
N.4925	Ice-Cream	Informal	Fat content only 4·4 per cent. Should be not less than 5·0 per cent.	Vendor cautioned.
C.2795	Black Pudding, Part of	Informal	Contained a small roll of corrugated paper which weighed 0·4 gramme and separately another piece of paper weighing 0·04 gramme.	Manufacturer cautioned and complainant informed.
S.8857	Bottle of Medicine (Prescription)	Informal	Contained a dead house spider weighing 10 milligrams. The sample measured 4½ fluid ounces and had the characters of Opiate Squill Linctus for infants.	Reported to the Secretary of Local Executive Council of the National Health Service.
C.2801	Pork Luncheon Meat, Opened Can	Informal	Contained a minute fragment of skin with several attached hairs of the nature of hog hairs, weighing in all 3 milligrams.	Importers communicated with and complainant informed.
N.4950	Dandelion and Burdock, Part Bottle	Informal	Sample contained 12·3 milligrams of tar acids (as Phenol). Tar acids on the stopper and red rubber ring were an additional 38 milligrams (as Phenol).	Manufacturers cautioned and complainant informed.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
C.2662	Orange Crush (Part Bottle)	Informal	Contained 20 milligrams of a volatile hydrocarbon of the nature of paraffin in the contents of the bottle and the sealing ring to the plastic cap.	Bottlers cautioned and complainant informed.
E.3875	Pork Sausage	Informal	Meat content only 63·0 per cent.	Poor in meat content.
N.5007	Pork Sausage	Informal	Contained 180 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor cautioned.
N.5010	Pork Sausage	Informal	Meat content only 56·5 per cent. Poor in meat content. Contained 160 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor cautioned re preservative.
E.3876	Baked Beans with Tomato Sauce, Canned	Informal	Sample was found to be a brand of dog food.	Section 2, Food and Drugs Act, 1955. Fined £10 and £13 costs.
C.2888	Borax, B.P.	Informal	Borax content 105 per cent. B.P. maximum limit 103 per cent.	No action advised.
N.5059	Pork Sausage	Informal	Contained 135 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor cautioned.
E.3937	Beef Sausage	Informal	Contained 100 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor cautioned.
E.3942	Bread	Informal	The sample was infested with mould.	Section 2, Food and Drugs Act, 1955. Fined £20 and £13 costs.
E.9879	Fried Chipped Potatoes	Informal	Contained the greater part (thorax and abdomen) of an adult female cockroach weighing 0·335 gramme and four small insect fragments together weighing 0·010 gramme.	Section 2, Food and Drugs Act, 1955. Fined £10 and £11.16.0 costs.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
E.9880	Fish Fingers, Frozen	Informal	Contained a piece of stainless steel wire approximately 8·6 millimetres in length, and weighing 69 milligrams.	Manufacturers cautioned and complainant informed.
E.3950	Pork Sausage	Informal	Contained 200 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor cautioned.
C.2933	Vegetables, Dried (Peas)	Informal	Contained 3·6 per cent. of unsound peas together with a small amount of frass and webbing	Referred to Local Authority concerned.
N.5108	Desiccated Coconut	Private	Contained approximately one gramme of chocolate cake decorations.	Kitchen Supervisor informed.
S.9170	Double Cream	Informal	Butter fat content only 43·5 per cent. Should be not less than 48 per cent.	Vendor cautioned.
S.9197	Channel Islands Milk	Formal	Fat content 3·85 per cent. Deficient 3·7 per cent. fat.	Producer cautioned.
S.9102	Bread (Part Loaf)	Informal	Contained one slightly bent flat headed iron nail measuring approximately 20·7 millimetres in length and weighing 0·254 gramme.	Section 2, Food and Drugs Act, 1955. Fined £20 and £10.18.0 costs.
N.5146	Vegetable Salad (Jar)	Informal	Contained 4·3 per cent. of vegetable oil without declaration in list of ingredients	Importers communicated with.
N.5149	Bread	Informal	10·6 grammes of the crumb were slightly discoloured and contained 50 parts per million iron and 7·2 parts per million lead.	Bakers cautioned and complainant informed.
E.9881	Potato Crisps (Part Packet)	Informal	The part packet contained a small potato weighing 4·8 grammes. This and the crisps were infested with mould (Aspergillus repens).	Manufacturers cautioned and complainant informed.
N.9157	Orange Crush (Part Bottle)	Informal	Actively fermenting with wild yeast. Contained 1·74 per cent. w/v alcohol.	Manufacturers interviewed and complainant informed.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
E.4930	Minced Beef with Onion and Gravy, Canned	Informal	Undue prominence given to the words MINCED BEEF in name of food.	Packers communicated with.
E.4931	Stewed Steak with Rich Gravy, Canned.	Informal	Undue prominence given to the words STEWED STEAK in name of food.	Packers communicated with.
C.2670	Gelatine	Informal	Contained 1·2 milligrams of finely divided metal of the nature of tinned iron in the 7 ounce sample.	Manufacturer interviewed and remaining stock destroyed.
E.4052	Beef Sausage	Informal	Contained 115 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor interviewed and cautioned.
C.3065	Boned Chicken in in Jelly, Canned	Informal	Chicken content only 70·0 per cent. Proposed standard 80·0 per cent. chicken.	Importers taking steps to prevent a recurrence.
C.3066	Tomato Juice, Canned	Informal	Contained finely divided loose particles of solder from the seams of the can.	No further stock available.
C.3067	Tomato Puree, Canned	Informal	Contained 415 parts per million tin. Recommended maximum limit 250 parts per million.	See samples Nos. C.3189 and C.3190.
E.4082	Pork Sausage	Informal	Meat content only 58·5 per cent.	Poor in meat content.
N.5277	Beef Suet	Informal	Beef fat content only 80·7 per cent. Should be not less than 83·0 per cent.	Manufacturers taking steps to prevent a recurrence.
N.5297	Cough Syrup	Informal	Contained a frothing agent. List of ingredients on label included Quillaia which contains saponins. Saponins are undesirable for internal use.	Old stock. Remainder of stock withdrawn from sale.
C.3105	Dietary Loaf	Informal	Calcium content only 15·6 milligrams per ounce compared with 34·1 milligrams per ounce declared.	Manufacturers agreed to amend labels.
E.4115	Tart Filling	Informal	Contained approximately 1·0 per cent. of maize starch without declaration in list of ingredients.	Manufacturer communicated with.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
E.4116	Flour	Informal	Contained seven live caterpillars of the Mediterranean Flour Moth together with a small amount of webbing.	Remainder of stock withdrawn from sale.
C.3132	Channel Islands Milk	Formal	Contained 0·1 I.U. penicillin per ml.	Section 2, Food and Drugs Act, 1955. Fined £5 and £9.17.0 costs.
S.9325	Fruit, Canned	Informal	Contained a dead Red Ant.	Importers cautioned.
S.9326	Fruit Canned	Informal	Amount of pears in can were approximately twice as much as the next ingredient, yet pears printed second in the statement of ingredients on label.	Manufacturers communicated with.
C.3140	Ethnine Linctus	Informal	Consisted of Elixis Ephedrine Compound and not Ethnine Linctus.	Pharmacist cautioned.
C.3170	Bread	Informal	Contained 0·18 gramme of brown flour dough which contained 22 milligrams of edible oil and 0·1 milligram of iron (as Fe).	Bakery notified and complainant informed.
N.5361	Flour Confectionery	Informal	Contained a Confused Flour Beetle (Tribolium confusum) weighing 2 milligrams baked in the cake.	Bakery cautioned and complainant informed.
N.5367	Flour	Private	Creta praeparata only 177 milligrams per 100 grammes Limits 235 to 390 milligrams per 100 grammes.	Millers informed.
E.4169	Pork Sausage	Informal	Meat content 57·0 per cent.	Poor in meat content.
E.4180	Fish Cake (part of)	Informal	Contained a broken piece of green glass of the nature of bottle glass weighing 1·42 grammes.	Manufacturer taking steps to prevent a recurrence and complainant informed.
C.3189	Tomato Puree, Canned	Informal	Contained 520 parts per million of tin. Recommended maximum limit 250 parts per million.	Remaining stock withdrawn from sale.
C.3190	Tomato Puree, Canned	Informal	Contained 290 parts per million of tin. Recommended maximum limit 250 parts per million.	

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
S.9346	Ice-Cream	Informal	Contained 0·005 per cent. saccharin. Food Standards (Ice-Cream) Regulations, 1959, prohibit the presence of any artificial sweetener in ice-cream.	Manufacturer cautioned.
S.9347	Ice Lollies	Informal	List of ingredients on label included a word ALGINADE instead of ALGINATE.	Manufacturers agreed to amend labels.
S.9349	Ice Lollies	Informal	Consisted of a chocolate covered ice-cream lolly, yet labelled with a list of ingredients appropriate to a fruit flavoured ice lolly.	Manufacturers communicated with.
N.5391	Blancmange Powder	Informal	Carton contained only four packets (total net weight of contents 151 grammes) although packet labelled "5 ONE PINT ENVELOPES" and "MINIMUM NET WEIGHT 159 GRAM."	Packers and vendor cautioned.
C.2675	Fruit, Canned (opened can)	Informal	Contained a dead slug weighing 0·11 gramme.	Importers communicated with and complainant informed.
1/66	Chocolate Wafer Bar	Informal	Contained 0·07 gramme of carbonised starch.	Manufacturers taking steps to prevent a recurrence and complainant informed
C.3228	Bread (part loaf)	Informal	Contained 1·7 grammes of discoloured dough of which 1·1 grammes consisted of brown bread dough and the whole contained 56 milligrams of mineral oil with 0·2 milligram iron and 0·15 milligram copper.	Bakery cautioned and complainant informed.
1	Stewed Steak, Canned	Informal	Contained a heavy growth of a green sporing mould of a Penicillium species. There was a small cut in the side of the tin.	Packers communicated with and complainant informed.
C.2676	Beer	Informal	Contained 23 parts per million of Copper and 10 parts per million of Zinc. Recommended maximum limits are 7 parts per million of Copper and 5 parts per million of Zinc. Sample was also somewhat turbid due to the presence of yeast.	Vendor interviewed and complainant informed.

Table 21—*continued.*

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
E.4251	Potato Crisps	Informal	Contained 35 dead beetles each approximately 3·5 millimetres in length together with 5 dead beetle larvae each approximately 2 millimetres in length, all of the species Ptinus tectus.	Section 2, Food and Drugs Act, 1955. Fined £50 and £18.5.0 costs.
C.2678	Fruit, Canned (Pears)	Informal	Contained one whole cricket (family Gryllidae) and parts of three other crickets. The crickets gave a negative phosphatase test and appeared to have been in the canned pears at the time of processing.	Importers cautioned and complainant informed.
C.3269	Tomato Paste	Informal	Contained 345 parts per million of tin. Recommended maximum limit 250 parts per million.	See samples Nos. E.4390 and E.4391.
C.3270	Glace Cherries	Informal	Contained 70 parts per million of the non-permitted preservative Benzoic Acid.	Packers communicated with.
S.9433	Pork Sausages	Informal	Contained 260 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor interviewed and cautioned.
C.3325	Chocolate Peppermint Bar.	Informal	Contained a dead Cocoa moth larva, in two pieces, approximately 15 millimetres in total length and weighing a total of 5 milligrams together with 22 milligrams of insect excreta and webbing.	Prosecution not proceeded with. Defendant deceased.
C.3326	Chocolate Peppermint Bars	Informal	Contained 5 live Cocoa moth larvae varying in length from 6 millimetres to 12 millimetres.	Same source as sample No. C.3325
E.4304	Cream, Sterilised	Informal	Fat content only 22·7 per cent. Should be not less than 23·0 per cent.	No action advised.
N.5464	Cremotresamide Suspension	Informal	Contained 9·2 per cent. Succinyl sulphathiozole and 8·8 per cent. Kaolin in a mint flavoured chocolate suspension, i.e. not cremotresamide suspension as prescribed.	Pharmacist interviewed and cautioned.
N.5477	Sulphonamide Suspension	Informal	Total content of sulphonamides only 440 milligrams per teaspoonful (5 mls.). Should be 500 milligrams per teaspoonful.	Pharmacist interviewed and catuioned.

Table 21—*continued.*

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
N.5480	Christmas Pudding	Informal	Contained 310 parts per million Propionic Acid. The Preservative in Food Regulations, 1962, do not permit Propionic Acid in Christmas Puddings.	Same source as sample No. E.4359.
E.4310	Bread, portion of	Informal	Contained 0·29 gramme of burnt brown flour dough containing 4·4 milligrams of Iron (as Fe_3O_4).	Bakery cautioned and complainant informed.
S.9504	Shredded Beef Suet	Informal	Beef fat content only 74·8 per cent. (should be 83·0 per cent.) and contained "Rice Flour" although inappropriately designated in the list of ingredients merely as "Flour".	Manufacturers taking steps to prevent a recurrence.
E.4359	Christmas Pudding	Informal	Contained 235 parts per million of Propionic Acid.	Same manufacturer as sample No. N.5480. Manufacturer cautioned.
N.5533	Sulphonamide Suspension	Informal	Labelled "Sulphamerazine B.P. . . ." etc. Sulphamerazine deleted from 1963 B.P.	No action advised.
E.4373	Ice Lolly	Informal	Had salty taste and contained 0·9 per cent. mineral matter including 0·4 per cent. Salt (NaCl), Calcium (as Ca) 0·2 per cent. and Phosphate (as P_2O_5) 0·2 per cent.	Manufacturers taking steps to prevent a recurrence and complainant informed.
E.4381	Pork Sausage	Informal	Contained 35 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor interviewed and cautioned.
E.4387	Marzipan	Informal	Sugar present in greatest quantity yet printed third in order in list of ingredients.	Packers communicated with.
E.4398	Flour Confectionery	Informal	Contained 2 fragments of pink coloured paper, with blue printing, weighing in all 0·14 gramme.	Bakery cautioned and complainant informed.
E.4390	Tomato Paste, Canned	Informal	Contained 360 parts per million tin. Recommended maximum limit 250 parts per million.	Same source as sample No. C.3269. Importers informed and remainder of stock withdrawn from sale.
E.4391	Tomato Paste, Canned	Informal	Contained 360 parts per million tin.	

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
N.5564	Ground Arrowroot	Private	Sample lumpy. Appearance of old or badly stored stock.	Supervisor of school kitchen informed.
S.9557	Fruit and Nut Chocolate	Informal	Contained a fragment of broken glass weighing 0·19 gramme.	Manufacturer cautioned and complainant informed.
E.4454	Fruit, Canned	Informal	Lacquer peeling from can.	No further stock available.
E.9882	Flour Confectionery	Informal	The insect submitted with the sample of pastry was a Stegobium paniceum (Drug-store beetle).	Complainant and Local Public Health Inspector informed.
S.9603	Meat, Canned	Informal	Surfaces of the meat were marked with small areas stained by sulphides of iron and tin from the metal of the can. The stained material weighed in all 0·26 gramme.	Complainant informed.
C.3504	Grapefruit Juice, Canned	Informal	Sample had an unusual odour, probably due to changes in the natural essential oils.	Complainant informed.
E.4505	Butter	Informal	Contained a stout vegetable fibre bristle approximately $2\frac{3}{8}$ inches long.	Packers cautioned and complainant informed.
E.4506	Bread	Informal	Contained 0·051 gramme of brown bread dough.	Bakery communicated with and complainant informed.
E.4521	Bread	Informal	Contained 23 milligrams of dough discoloured with 0·035 milligram of iron and contained five vegetable bristles up to 7·5 millimetres in length.	Bakery cautioned and complainant informed.
E.4560	Christmas Pudding	Informal	Contained 200 parts per million Propionic Acid.	Same manufacturer as samples Nos. N.5480 and E.4359.
E.4572	Bread	Informal	Contained a frayed fibre of the nature of coconut fibre 15 millimetres long and weighing 8 milligrams.	Bakers cautioned and complainant informed.

THE LABELLING OF FOOD ORDER

The first Labelling of Food Order was made in the year 1944, but it has been amended or re-enacted on several occasions since that time. The Order at present in force is the Labelling of Food Order, 1953, which came into operation on the 5th April of that year and which has been kept in force by the Twelfth Schedule of the Food and Drugs Act, 1955. Five amendment regulations to the Labelling of Food Order, 1953, were made in the years, 1953, 1955, 1958, 1959 and 1961. No amendments have been made to the Order since the last mentioned date but the Food Standards Committee published in 1964 a report on food labelling which was followed in the year 1965 by Proposals for Regulations replacing certain parts of the Labelling of Food Order. These Proposals will affect only those parts of the Order which are concerned with food labelling. The question of claims and misleading descriptions has been the subject of a second report of the Food Standards Committee which was published during the year under review and which is described at the beginning of this report. It is to be expected that this will be followed by further Proposals dealing with claims and misleading descriptions and that after these have been considered new regulations will be made to replace the existing Order.

During the year under review 55 samples (36 County and 19 from Autonomous Authorities) were found to contravene the requirements of the Labelling of Food Order. Brief details of the 36 County samples will be found in table 21. Of the total number of samples to which exception was taken 37 (24 County) had labels which did not disclose one or more of the following requirements ; the name and address of the packer, the true name of the food or a correct list of ingredients. In each of the above instances, the packers were communicated with and their attention drawn to the requirements of the Order. During the previous year, 1965, the number of samples which contravened the Labelling of Food Order included 28 County samples and 25 from Autonomous Food and Drugs Authorities. The above figures do not include samples of sausage found to contain preservative without a declaration of its presence being made on the wrapper or notice—these are referred to in the section of the report dealing with sausage, etc. Nor do they include three County samples which infringed Weight and Measures requirements. In respect of two of these the incorrect declarations were brought to the attention of the vendors while the deficiency in volume of the remaining sample was reported to the County Chief Weights and Measures Inspector.

In the following paragraphs reference is made to a number of the more interesting samples, in relation to their labels, submitted by County Sampling Officers and by Autonomous Food and Drugs Authorities.

Foam Crystals, Samples Nos. E.2879 and E.3331.

These two informal samples of soft drink crystals both of the same manufacture but purchased from different shops bore a list of ingredients which included " saponin." Saponin is a frothing agent or foam stabiliser containing glycosides and it is obtained from quillaia bark. In the opinion of your analyst saponin is an undesirable ingredient for internal use because it is a powerful internal irritant and has a marked haemolytic action. This opinion is supported by the facts that other Food and Drugs Authorities have objected to its use in soft drinks, the British Pharmaceutical Codex, 1954, drew attention to its irritant and haemolytic action and in the U.S.A. its presence in food is regarded as adulteration. In the section of this report dealing with drugs reference is made to a sample of Cough Syrup (No. N.5297) which also contained quillaia but in that instance the manufacturers stated that it must have been very old stock as the use of quillaia had been discontinued for over 18 months. Some degree of differentiation appears to be drawn between saponin and quillaia. Saponin was deleted from the B.P.C. 1959 but quillaia is still present in the current B.P. and B.P.C. The Food Standards Committee Report on Emulsifying and Stabilising Agents, 1956, recommended that both quillaia and saponin should be excluded from any statutory definition of emulsifying agent but the Emulsifiers and Stabilisers in Food Regulations 1962 only excludes quillaia from the definition and saponin is not listed as a permitted emulsifier or stabiliser. The above points have been drawn to the attention of the packers of samples No's. E.2879 and E.3331 and the Food and Drugs Authority of the place of manufacture was also communicated with.

Pure Butter Eccles Cakes, Samples Nos. S.7963 and S.8072.

These two informal samples both of the same manufacture but purchased at different shops were sold under the above description. Upon analysis, however, it was found that they contained 11·6 per cent. and 15·1 per cent. respectively of total fat but the amounts of butter fat present were only 8·4 per cent. and 10·0 per cent. respectively. In your analyst's opinion a description such as that applied to the above samples indicates to a purchaser that the whole of the added fat consists of butter. The manufacturers were communicated with and they at once agreed to take steps to amend their label.

Buttercake Biscuits, Sample No. S8042

This is a similar instance to the one mentioned above in that upon analysis this sample was found to contain 24·9 per cent. of total fat but only 14·2 per cent. of butter fat. Here again the view was expressed

to the manufacturers that the above description, particularly without any qualification, should indicate that the whole of the added fat consists of butter and they agreed to amend their label to indicate clearly the proportion of butter used.

Dairy Almond Cake, Sample No. S.8114

In this instance analysis indicated that the dry matter of the cake contained 5 per cent. of skimmed milk powder but no milk fat was present. The bakery firm concerned was communicated with and informed that in your analyst's opinion the use of the word " dairy " was undesirable in relation to this product unless it contained whole milk solids as distinct from skimmed milk solids. After discussing this matter with a representative of the firm the bakers agreed to both increase the proportion of skim milk powder and to replace some of the added fat with sufficient butter to make all the skim milk powder equivalent to whole milk powder.

Glucose Sweets, Sample No. C.2243

This informal sample bore a label which stated " Glucose Stick a source of energy " and " Pure Glucose products . . ." Upon analysis, however, the ingredients of the sweets were found to include 67·5 per cent. sucrose and 26·5 per cent. glucose syrup solids. The main ingredient and source of energy was, therefore, sucrose and the other ingredient was not pure glucose (dextrose) but was glucose syrup solids. The manufacturers were communicated with and informed that the special reference to glucose and the claims made for it as a source of energy should be deleted from the label. The makers finally agreed to give consideration to amending their label after prolonged correspondence in which it was pointed out that if voluntary reference is made to ingredients it should refer to all the ingredients in their correct order ; that it is incorrect to infer that glucose syrup has greater nutritional or energy value than sucrose and that this is the view of the Food Standards Committee of the Ministry of Agriculture, Fisheries and Food, and, finally, that the British Glucose Manufacturers Association announced in 1965 that the name " Glucose syrup " would be used in future in place of " liquid glucose " or " glucose."

Pickles, Sample No. E.3544

This formal sample of pickled onions was purchased as a result of the analysis of two previous samples (Nos. E.3468 and E.3538) of the same product. The examination of these samples revealed infringements of the Preservatives in Food Regulations, 1962, but as one infringement was in respect of labelling the samples are mentioned in this section of

the report. Sample No. E.3544 was found to contain 360 parts per million of sulphite preservative expressed as sulphur dioxide ; the two previous samples also contained similar amounts of sulphite preservative. Schedule I of the Regulations states that the maximum permitted limit for sulphur dioxide in pickles is 100 parts per million. There was present, therefore, an excess of 260 parts per million of sulphur dioxide. Furthermore, pickles are also included in Paragraph I of Schedule 3 of the Regulations and are, therefore, required to bear a declaration of the presence of preservative if permitted preservative is present. Legal proceedings were instituted directly against the manufacturer of the pickles under Section 113 (3) of the Food and Drugs Act for infringements of Regulation 3 and Regulations 5 (1) of the Preservatives in Food Regulations 1962 and at the hearing of the case the firm pleaded " guilty " and was fined £5 for each infringement together with £7 15s. 0d costs (£17 15s. 0d. in all).

Starch Reduced Potato Crisps, Sample No. C.2661

This informal prepacked sample bore a list of ingredients which stated " Starch reduced potatoes, edible oil and salt." Upon analysis the sample was found to contain 2·3 per cent. moisture, 48·4 per cent. of oil and 40·9 per cent. of starch ; these figures correspond to 79·3 per cent. of starch on the oil-free crisps and, when calculated to a similar moisture content, there was no significant difference in the starch content of the crisps as compared with edible raw potato or with crisps made by other manufacturers for which no special claims are made. In view of the above findings the manufacturers were communicated with and asked to amend their label.

Baked Beans with Tomato Sauce, Sample No. E.3737

This sample consisted of an opened can which had originally been purchased by the complainant at a supermarket. When submitted there was half of a printed Baked Beans with Tomato Sauce label, which stated the net weight to be 8 oz., wrapped round and gummed to the can. Upon examination it was found that the contents of the can had no resemblance to baked beans but consisted of a coarse brown paste with a strong fishy odour and the net weight was only 7·1 ounces. An analysis of a can of a brand of cat food purchased from the same shop showed that it contained 66 per cent. of meat and fish together with cereal filler and added water and it was identical in appearance and composition with the complaint sample. The declared net weight on the label of the cat food was $7\frac{1}{4}$ ounces. Although the two cans were, therefore, some $\frac{3}{4}$ ounce different in size, they were very similar in general appearance and clearly there had been a mistake in replacing labels on cans which had lost their labels. The replacing of labels on

unlabelled cans on retail premises carrying stocks of very varied commodities which may not be easy to identify, particularly by inexperienced staff, is to be deprecated. Legal proceedings were instituted under Section 2 of the Food and Drugs Act against the owners of the supermarket who at the hearing of the case pleaded " guilty " and were fined £10 0s. 0d. together with £7 15s. 0d. costs.

Baked Beans in Tomato Sauce, Sample No. E.3876

The circumstances in connection with this sample are almost identical with those of the previous sample. This can had been purchased from another supermarket by the complainant who on opening it found that it apparently contained pieces of meat. Upon comparison with a sample of a brand of dog food purchased from the same retail premises it was found that both contained approximately 35 per cent. of meat together with cereal filler and added water. Here again it was clear that an unlabelled can had had an incorrect label attached to it. In this instance also successful legal proceedings were instituted against the owners of the supermarket who were fined £10 0s. 0d. together with £13 0s. 0d. costs.

Ice Lollies, Sample No. S.9349

This informal sample consisted of three prepacked ice lollies each of which bore a label stating the ingredients to be " sugar, stabilizer, fruit juice, citric acid, colouring, saccharin." The appearance of the lollies, however, was that of " choc ices," *i.e.*, chocolate covered ices on sticks and this was confirmed by the analysis of the filling which consisted of ice-cream containing 8·3 per cent. fat and 11·5 per cent. milk solids other than fat ; the total solids of the filling amounting to 30·4 per cent. The list of ingredients was clearly not applicable to this type of product but was intended for the normal type of fruit flavoured lolly free from fat or ice-cream. The packers of this sample were cautioned with regard to the use of an incorrect label.

Hot Dog Skinless Sausages, canned, Sample No. N.7939

This informal sample of an imported product bore a label which stated the net weight of the contents of the can to be 16 ounces and the net weight of the sausages 8 ounces. Upon analysis it was found that 50 per cent. of the contents of the can consisted of brine although no direct reference was made anywhere on the label to the presence of brine beyond including " salt " in the normal list of ingredients. The meat content of the sausages alone was found to be 52 per cent. The manufacturers were communicated with and advised that the words " packed in brine " should appear in close proximity to the name of the product. After some correspondence we were informed that the foreign packers had agreed to amend their label on the lines suggested.

Dietary Loaf, Sample No. C.3105

This informal samples of a prepacked eight ounce loaf bore a label which claimed that it was rich in protein and low in starch and which gave a detailed quantitative statement of all the constituents present including minerals and vitamins. Upon analysis the claims and the analysis given were substantiated except that the sample was found to contain 15·6 milligrams of calcium per ounce whereas the claim was made on the label that it contained 34·1 milligrams per ounce. The packers were communicated with and they agreed that their recent check analyses had indicated calcium contents of the order found in respect of this sample and that the label on their product had already been amended to correct the previous mis-statement.

Food Colouring Matters, Samples Nos. 444, 572 and 4/66

These three informal prepacked samples were submitted by three different Autonomous Food and Drugs Authorities. The first sample described as " Cochineal extract " was found to consist of the aluminium lake of cochineal in a solution containing approximately 0·5 per cent. caustic potash and some isopropyl alcohol. The label of this sample should, therefore, have had printed on it an appropriate list of ingredients. Sample No. 572 was described as " Cochineal " and within a surrounding line with the words " Solution of Synthetic Colour. This food colouring conforms to the statutory requirements of the United Kingdom." Upon analysis the sample was found to consist of the aluminium lake of the natural colour cochineal in approximately 0·5 per cent. caustic potash solution. Cochineal is not a synthetic colour and the presence of caustic potash should have been declared. Furthermore, the declaration within the surrounding line on the label did not conform to that specified in the Colouring Matter in Food Regulations. The last sample, number 4/66, was described as " cochineal substitute food colour " and was found to consist of the permitted synthetic colouring matter Carmoisine in a glycerine solution. The label should, therefore, have included a list of ingredients including the words " synthetic colour " or " artificial colour." The packers of the above samples were communicated with by the food and drugs authorities concerned drawing attention to the infringements of the Colouring Matter in Food Regulations and of The Labelling of Food Order.

Buttered Kipper Fillets, Sample No. 46

This informal prepacked sample submitted by an Autonomous Food and Drugs Authority weighed six ounces but the amount of butter present was only 1/10th of an ounce. Part II of the Labelling of Food Order requires a prepacked food of two or more ingredients to bear on a label actually attached to the wrapper both the common or usual name

of the food and a complete list of ingredients in the correct order. It has also been normal practice, at least as far back as 1949 (see para, 22 of the Ministry of Food Report on the Advertising, Labelling and Composition of Food), that where the description of a food includes the names of two or more ingredients, the ingredient present in the greatest quantity should be named first. This principle has also been adopted in the 1965 Proposals for Regulations on the Labelling of Food, para. 3 (2) (*b*). Sample No. 46 was simply described on the wrapper as " Buttered Kipper Fillets " and it did not bear a list of ingredients. The manufacturers were informed of the requirements of the Labelling of Food Order and it was suggested that the name " Kipper fillets with butter " would be appropriate. The packers agreed to use correct labels in future.

Truffle Pate, Sample No. 31

This informal sample of an imported product also submitted by an Autonomous Food and Drugs Authority had been sold non-prepacked under the above description. Upon analysis, however, it was found to be a liver paste containing 84 per cent. of meat but no evidence of the presence of any truffle could be found. The retail vendors were interviewed and informed that this product must not be sold as truffle pate. Subsequently the retail firm informed the Sampling Officer that supplies of this product were no longer available to them.

Vitamin Fruit Syrup, Sample No. 62/66

This informal prepacked sample of an imported product bore on the label a statement that it was " made from rose hips, tomatoes, red currants and raspberries " and the following claims were also made " contains 80 milligrams Vitamin C per fluid ounce " and ". . .excellent source of natural Vitamin C also other vitamins, minerals . . ." This product would appear to be excluded by definition from the Soft Drinks Regulations, 1964, in that it is a preparation which includes tomato juice. The quantity of Vitamin C present was found to be satisfactory both in respect of the declared amount and the claim that the product was an excellent source of this vitamin. No quantitative details were given on the label, however, with regard to other vitamins and minerals although a general claim of the presence was made ; the omission of quantitative particulars being contrary to the requirements of Part VI of the Labelling of Food Order, 1953. The importers of this product were communicated with and they stated that they were already looking into the question of making changes in the label to satisfy the requirements of the Labelling of Food Order. A proposed new label was submitted for information but while reference in English to other vitamins and minerals had been deleted these were still referred to in the original language on the opposite panel. It was again pointed out that this could not be regarded as satisfactory.

Ice-Cream

Until November, 1948, there was no control in this country on the composition of ice-cream. In that month, however, the Ministry of Food decided to allocate additional supplies of sugar, and in some cases fats, to those manufacturers who undertook to include at least 2·5 per cent. fat in their ice-cream. In March, 1951, the first Statutory Standard for ice-cream was made and, except for a short period between July, 1952, and June, 1953, when a slightly reduced standard was temporarily introduced, the minimum standard then laid down was in operation until April, 1959. This standard required ice-cream to contain not less than 5 per cent. fat, 10 per cent. sugar and $7\frac{1}{2}$ per cent. milk solids other than fat. There were special standards for ice-cream containing fruit and for " Parev " (kosher) ice. The required sugar content of ice-cream could be made up of certain other sugars in addition to sucrose but no ice-cream was permitted to contain less than $7\frac{1}{2}$ per cent. sucrose.

When the above standard was first introduced in the year 1951 the Food Standards Committee of the Ministry of Food stated that it was not an ideal standard and that it should be amended and improved as supplies of ingredients became more plentiful. It was not surprising, therefore, that a Food Standards Committee report on the ice-cream standards was published in December, 1957, and that this should be followed by the making of the Food Standards (Ice-Cream) Regulations, 1959, which came into operation on the 27th April, 1959. The standard incorporated in these regulations and which is in force today, is as follows and applies whether or not the ice-cream forms part of a composite article of food :—

> " (*a*) Ice-Cream shall contain not less than 5 per cent. fat and $7\frac{1}{2}$ per cent. milk solids other than fat, so, however, that where ice-cream contains any fruit, fruit pulp or fruit purée it shall either conform to the above standard or, alternatively, the total content of fat and milk solids other than fat shall be not less than $12\frac{1}{2}$ per cent. of the whole including the fruit, fruit pulp or fruit purée, as the case may be, and such total content of fat and milk solids other than fat shall include not less than $7\frac{1}{2}$ per cent. fat and 2 per cent. milk solids other than fat ;
>
> Provided that as respects any ice-cream sold, or offered or exposed for sale under any of the descriptions hereinafter specified or under any such other description as is calculated to lead an intending purchaser to believe that he is purchasing ice-cream of any such description as is so specified, the standard of composition shall be as follows :—

(*i*) Dairy ice-cream, dairy cream ice or cream ice shall in each case contain not less than 5 per cent. milk fat and no other fat (save as may be introduced by the use as an ingredient of any egg, any flavouring substance or any emulsifying or stabilising agent) and not less than $7\frac{1}{2}$ per cent. milk solids other than fat, so, however, that where any dairy ice-cream, dairy cream ice or cream ice contains any fruit, fruit pulp or fruit purée it shall either conform to the standard of composition for that ice-cream, or alternatively, the total content of milk-fat and milk solids other than fat shall be not less than $12\frac{1}{2}$ per cent. of the whole including the fruit, fruit pulp or fruit purée, as the case may be, and such total content of milk-fat and milk solids other than fat shall include not less than $7\frac{1}{2}$ per cent. milk-fat and no other fat (save as may be introduced by the use as an ingredient of any egg, any flavouring substance or any emulsifying or stabilising agent) and not less than 2 per cent. milk solids other than fat.

(*ii*) Milk ice or milk ice containing any fruit, fruit pulp or fruit purée shall contain not less than $2\frac{1}{2}$ per cent. milk-fat and no other fat (save as may be introduced by the use as an ingredient of any egg, any flavouring substance or any emulsifying or stabilising agent) and not less than 7 per cent. milk solids other than fat.

(*iii*) " Parev " (kosher) ice shall contain not less than 10 per cent. fat and no milk-fat or other derivative of milk.

(*b*) No ice-cream of any description shall contain any artificial sweetener.

In this Schedule—

(*a*) 'artificial sweetener' means any chemical compound which is sweet to the taste, and the expression includes polyhydric alcohols but does not include sugar or any other carbohydrate.

(*b*) each reference to any proportion or percentage means that proportion or percentage by weight."

It will be noted that there is no minimum standard for sugar content but there is a specific prohibition to the use of artificial sweeteners. The most important change, however, was the introduction of the special standards for dairy ice-cream, dairy cream ice, cream ice and milk ice which are all required to contain specified minimum amounts of milk-fat, the use of the other types of fat not being permitted in these varieties of ice-cream.

On the same day that this standard came into operation an amendment to the Labelling of Food Order also came into force and this introduced requirements as to the labelling of ice-cream. It is illegal to label or advertise ice-cream by means of words or pictorial devices suggestive of butter, cream, milk or anything connected with the dairy interest unless the ice-cream contains no fat other than milk-fat. The label or advertisement may, however, bear a statement to the effect that the ice-cream contains skimmed milk solids. It is also an offence to sell under the description " ice-cream " any prepacked ice-cream which contains fat other than milk-fat unless the wrapper also bears in letters of a specified height either the declaration " contains non-milk-fat " or, if appropriate, the declaration " contains vegetable fat." The above requirements also apply to ice-cream which forms part of a composite article of food.

A third regulation concerning both ice-cream and certain types of ice-lollies also came into operation on the 27th April, 1959, *i.e.*, the Ice-Cream (Heat Treatment, etc.) Regulations, 1959. These regulations consolidate and amend the Ice-Cream (Heat Treatment) Regulations, 1947 to 1952. The regulations require the ingredients of ice-cream after mixing to be either pasteurised or sterilised by one or other of the following methods :—

Pasteurisation

" Method I. The mixture shall be raised to and kept at a temperature of not less than 150° Fahrenheit for at least 30 minutes.

Method II. The mixture shall be raised to and kept at a temperature of not less than 160° Fahrenheit for at least 10 minutes.

Method III. The mixture shall be raised to and kept at a temperature of not less than 175° Fahrenheit for at least 15 seconds.

Sterilisation

The mixture shall be raised to and kept at a temperature of not less than 300° Fahrenheit for at least 2 seconds."

Before heat treatment the mixture shall not be kept for more than one hour at any temperature which exceeds 45°F. and after heat-treatment it shall be cooled to not more than 45°F. within $1\frac{1}{2}$ hours and kept at this temperature until the freezing process is carried out. After freezing the ice-cream shall be kept at a temperature not exceeding 28°F. ; if its temperature does exceed this figure it must again be heat-treated before being re-frozen.

The above requirements as to pasteurisation or sterilisation do not apply to the use of a complete cold mix reconstituted with drinking water if the mixture is made into ice-cream within one hour of reconstitution. Furthermore, the Ice-Cream (Heat-treatment, etc.) (Amendment) Regulations, 1963, also permit sugar to be added to a complete cold mix after it has been heat treated and before it is sent out by the manufacturer. The requirements also do not apply to any mixture (whether containing milk solids or not) used, either alone or with other mixtures, in the manufacture of water ice or similar products if the mixture has a pH value of 4·5 or less. It is considered that such products are sufficiently acid to prevent the growth of harmful bacteria without heat-treatment.

During the year 1965 proposals for new regulations covering both the composition and labelling of ice-cream were circulated to interested parties by the Government. These were briefly described at the beginning of this report for that year and it is sufficient to say here that it is proposed to retain the same standards of composition as are in force today but to extend to all ice-cream, whether prepacked or not, which contains non-milk fat the labelling requirements which apply at present only to prepacked ice-cream.

It will be noted from table 22 that the average fat content of ice-cream during the year under review was 8·8 per cent. and that this is only 0·1 per cent. below the figure recorded for the previous year and that the general improvement in the fat content of ice-cream found over the last 18 years has been maintained. A perusal of the table shows that the average fat content in 1946 was only 2·3 per cent. whereas for 1966 it was 8·8 per cent. Furthermore, the lowest fat content found during 1966 was 4·4 per cent. ; whereas in the four years 1946 to 1949 fats as low as 0·3 and even 0·1 per cent. were found. Table 22 shows the results for all samples of ice-cream examined in the County Laboratory whether submitted by County Sampling Officers or by Autoomous Food and Drugs Authorities.

During the year 1966, 138 samples of ice-cream (excluding samples of dairy ice-cream and milk ice) were submitted for chemical analysis, 80 by County Sampling Officers and 58 by Autonomous Food and Drugs Authorities. Of these, nine samples (six County) were reported upon adversely. In the year 1965, the number of samples reported upon adversely was six. Of the nine unsatisfactory samples five were deficient in milk solids other-than-fat, one was deficient in fat, one contained the artificial sweetener saccharin and two contained traces of tinned iron particles.

Details of the six incorrect County samples, together with the action taken, will be found in table 21.

The average figures found for the 138 samples were—total solids 34·4 per cent. (maximum 58·6 ; minimum 25·6) and for fat content 8·8 per cent. (maximum 14·9 ; minimum 4·4). These figures as will be seen from the following table, which includes figures for the last 20 years, show that the big improvement in composition noted in the year 1950 has been maintained. It will be remembered that prior to the war a figure of eight per cent. was suggested by a trade association as a minimum standard for fat content and it is interesting to note that during the year under review, 82 samples out of a total of 138 showed fat contents varying from 8·0 to 14·9 per cent.

Table 22—Ice-Cream

Year	Number of Samples	Fat Content Average %	Total Solids Average %	Highest Fat %	Lowest Fat %	Highest Total Solids %	Lowest Total Solids %
1946	45	2·3	22·5	10·7	0·1	36·8	13·3
1947	59	3·0	23·6	10·6	Less than 0·1	39·2	14·1
1948	53	3·9	25·3	11·3	0·1	33·4	18·9
1949	171	6·4	29·3	13·3	0·3	45·9	14·7
1950	186	8·5	32·1	14·7	2·2	43·0	20·1
1951	230	8·6	32·6	15·6	3·3	40·7	23·0
1952	143	9·0	32·8	13·7	2·0	40·0	19·6
1953	130	8·6	32·7	15·2	2·5	42·3	23·3
1954	90	9·2	34·6	13·8	3·1	44·0	24·8
1955	95	8·1	33·2	13·3	3·5	40·9	24·3
1956	94	9·2	34·0	16·4	3·6	43·6	26·3
1957	99	8·7	33·3	14·7	3·0	41·9	22·9
1958	111	8·9	33·8	15·6	2·7	42·1	25·3
1959	104	8·9	34·6	17·4	4·6	55·2	27·4
1960	68	8·7	35·4	12·4	4·1	50·7	25·8
1961	114	9·7	35·7	14·8	4·6	50·1	27·1
1962	121	9·1	35·1	13·3	3·3	50·5	24·8
1963	95	8·5	34·1	13·8	2·7	50·4	26·0
1964	127	8·2	34·1	14·4	4·5	49·7	24·2
1965	106	8·9	34·8	14·8	4·7	53·5	24·0
1966	138	8·8	34·4	14·9	4·4	58·6	25·6

Dairy Ice-Cream

Seventeen samples (11 County) of dairy ice-cream, not included in the foregoing table, were also submitted for chemical analysis. The average figures found for the 17 samples were—total solids 31·4 per cent. (maximum 38·0 ; minimum 27·4) and for fat content 7·8 per cent. (maximum 13·2 ; minimum 4·9).

Of the seventeen samples examined only one sample (County) was reported upon adversely. This sample, No. C.2444, had a milk fat content of 4·9 per cent. (the minimum standard being 5·0 per cent.) but in view of the slight deficiency it was advised that no action be taken.

Milk Ice

One sample of Milk Ice submitted by an Autonomous Authority during the year under review was found to be satisfactory.

Ice Lollies

During the year under review 51 samples of ice lollies were submitted for examination under the Food and Drugs Act. Forty of the samples were submitted by the County Sampling Officers, and eleven samples by Autonomous Food and Drugs Authorities. Unlike ice-cream there is no statutory standard for the composition of ice lollies. They are specifically excluded from the provisions of the Food Standards (Ice-Cream) Regulations while the Food Standards (Soft Drinks) Order refers only to liquid soft drinks, although ice lollies are, in general similar in composition to soft drinks. Ice lollies and ice-cream are, however, both mentioned, indirectly or directly, in the Arsenic in Food Regulations and in the Lead in Food Regulations which were published in the years 1959 and 1961 respectively. In these, maximum limits of only one part per million for lead and 0·5 part per million for arsenic (as As) are specified for both commodities (the standard of one part per million for lead in ice lollies became 0·5 part per million on the 20th April, 1964). The limits for the majority of other foods are two parts per million and one part per million respectively. In addition to the statutory limits for lead and arsenic referred to above there are also recommended maximum limits for two other toxic metals in foods generally viz., copper 20 parts per million and zinc 50 parts per million. In view of the more stringent figures adopted for lead and arsenic in ice lollies and in ice-cream than in other foods, lower limits for copper and zinc might also be desirable for these particular types of commodities.

Of the 51 samples of Ice Lollies eight (six County and two from Autonomous Authorities) were reported upon adversely. Of these, six (five County and one from an Autonomous Authority) had unsatisfactory

labels. Another sample, No. E.4373 (County) had a salty taste and contained 0·9 per cent. mineral matter including 0·4 per cent. salt, 0·2 per cent. calcium and 0·2 per cent. phosphate. The remaining sample, from an Autonomous Authority, contained 0·4 per cent. calcium chloride.

The total solids (sugars, etc.) in the samples ranged from as little as 3·4 per cent., to 30·4 per cent. with an average for the 51 samples of 13·9 per cent. The average total solids for the 25 samples examined in the previous year was 14·9 per cent., while the average for 29 samples analysed in 1964 was 16·5 per cent.

Sausage, Meat Paste and Fish Paste

The last of the Meat Products Orders, which was revoked on the 1st March, 1953, in addition to controlling the price and meat content of sausages also prohibited the use of certain specified offals in the preparation of sausages and other uncooked open meat products intended for human consumption. The restriction on the use of these offals was re-enacted in the Offals in Meat Products Order, 1953, but no statutory regulations have so far been made to replace the requirements as to composition laid down in the Meat Products Orders. During the year 1965, however, proposals for regulations on suasages and other meat products were circulated for comment to interested parties by the Government. If these become law they will require sausage in general to contain 50 per cent. of meat and certain speciality sausages, including pork sausage, to contain 65 per cent. meat, while frankfurters, etc., not canned, will be required to contain 80 per cent. of meat.

The compositions of meat paste and of fish paste are controlled by the Food Standards (Meat Paste) Order, 1951, and the Food Standards (Fish Paste) Order, 1951: The standard for meat paste is a minimum of 55 per cent. meat and for fish paste a minimum of 70 per cent. fish. The Standards apply to both imported and home produced products. During the year under review proposals for new regulations relating to Fish and Meat spreadable products were circulated for comment. The proposals are described in detail at the beginning of this report and it will be sufficient to say here that it is proposed that the meat content of meat pastes should be increased to 70 per cent. In order to get over the confusion which exists in the minds of the purchasing public between the different qualities available it is also proposed that the term " spread " should be confined to products containing 70 per cent. of the named meat or fish while the term " paste " should, in future, only be used where the 70 per cent. includes varieties other than those named.

During the year 1966 a total of 154 samples of all types of sausages were examined as against 166 samples in the previous year. Eighty-nine samples were examined for the County while the remainder of the samples were examined for Autonomous Food and Drugs Authorities. Of the sausage samples submitted during the year under review 62 consisted of beef and 82 of pork sausage. Twenty-eight County samples and 13 submitted by other Food and Drugs Authorities were reported upon adversely. Of these, 23 contained normal amounts of preservative but without any declaration of its presence being made on the label or exhibited in the shops concerned. This is contrary to the requirements of Regulation 5 (1) and Schedule 3 of the Preservatives in Food Regulations, 1962. Twelve other samples were all poor in meat content, four more samples were poor in meat content and contained preservatives without declaration while a sample submitted by an Autonomous Food and Drugs Authority was found to contain an excess of sulphite preservative. In this last instance a further sample was found to be genuine. Finally, a can of Hot Dog Skinless Sausages was found to contain 50·0 per cent. of brine and the words "packed in brine" should have appeared on the label in close proximity to the name of the product.

It is interesting to note that the average meat content for the 62 samples of beef sausage examined in 1966 (61·9 per cent.) is higher by 3·5 per cent. than that for 1965 when the average meat content was 58·4 per cent. As regards pork sausage, the average meat content of the 82 samples examined during the year under review (68·7 per cent.) is almost identical to that for the year 1965 when the figure was 68·8 per cent. Bearing in mind that the standards before the 1st March, 1953, under the Commodity Control Order, were a minimum of 50 per cent. meat for beef sausage and beef sausage meat and a minimum of 65 per cent. meat for pork sausage and pork sausage meat, the average figures obtained in the County Laboratory during the year 1966 can be regarded as satisfactory. Fourteen of the 82 samples of pork sausage (or 17·1 per cent.) examined during the year under review were poor in meat content and five of these were County samples. From a perusal of table 21 it will be seen that of the five unsatisfactory County samples of pork sausage three might be regarded as only slightly low in meat in that they had meat contents between 63·0 and 64·0 per cent. while the remaining two had meat contents of 57·0 per cent. and 58·5 per cent. With regard to the samples of beef sausage, only one (County) was found to have a meat content below 50·0 per cent., the meat content of this sample being 47·5 per cent. Details of all the unsatisfactory County samples for the year under review together with the action taken will be found in table 21.

Twenty-one samples of meat paste (14 submitted by County Sampling Officers and seven by Autonomous Authorities) were examined during the year. Of these, one sample (submitted by an Autonomous Authority) was sold as Truffle Pâté but on examination it was found to consist simply of liver paste. In this instance the vendor was interviewed.

With regard to Fish Paste, 23 samples (16 County) were submitted for examination during the year and all these were found to be satisfactory.

Samples Containing Extraneous Matter

During the year under review 100 Food and Drugs Act samples (68 County) were reported upon adversely because they were found upon examination to contain extraneous matter. The corresponding number in the year 1965 was 90 samples (62 County) so that there has been a slight increase in this type of sample, the majority of which are submitted as the result of complaints made by members of the general public. In addition to the Food and Drugs Act samples, a further nine samples (seven County) found to contain extraneous matter were submitted under the heading of miscellaneous samples and are mentioned in Part VI of this report. Of the 100 Food and Drugs Act samples 25 (17 County) were samples of milk and a further 25 (18 County) were samples of bread, the remainder consisting of various types of foods. The wide range of extraneous matter found in the samples included :— rodent excrement, carbonised dough, mineral oil, iron oxide, iron wire, tinned iron, " gilt " particles containing copper and zinc, stainless steel wire, iron nail, solder, human hair, bovine skin and hair, hog skin and hair, paper, absorbent cotton lint, adhesive dressing, filter tip of cigarette, dyes, stub of a chinograph pencil, part of a feather, fungus, broken glass, fragments of cherry stones, vegetable fibres and bristles, fabric fibres, string, caustic soda, brown bread dough in white bread, struvite crystals (in canned salmon), tar acids, paraffin, yeast, calcium chloride, soil, bone, asphalt, dung (in milk), blood (in milk), toe of a bird, and wire staples. Brief details of ten County samples which were the subject of legal proceedings are given below. A further County prosecution in respect of broken glass in a milk bottle is mentioned in Part VI of this report and in the same section of the report reference is made to a prosecution instituted by an autonomous food and drugs authority in respect of rodent excrement found on a steak pie.

Sweet, Sample No. E.2595

This sample submitted as the result of a complaint consisted of one cherry-red coloured boiled sweet. The sweet was oblong in shape and oval in section and showed a moulding ridge all round. There was a piece of iron wire 32 millimetres in length and 1·1 millimetres in diameter firmly embedded in the sweet in the plane of the moulding ridge. The two ends of the wire protruded from the sweet and it showed constrictions in its diameter at the points adjacent to the moulding ridge. Legal proceedings were instituted under Section 2 and Section 113 (3) of the Food and Drugs Act against the two partners of the firm responsible for the manufacture of the sweets and at the hearing of the case they pleaded " guilty " and were each fined £1 0s. 0d. together with a total of £7 15s. 0d. costs (£9 15s. 0d. in all).

Bread, Sample No. E.2674

This complaint sample consisted of 15 slices and one end crust of a sliced large white loaf. Upon examination ten fragments of absorbent cotton lint weighing in all 0·80 gramme were found in cavities in the crumb of five adjacent slices of the bread. The pieces of lint were torn and ragged and appeared to have been cut through in slicing the loaf. The crumb of the bread adjacent to the lint was very moist, it contained some embedded cotton fibres and 0·047 per cent. of boric acid. The lint itself was moist, contained 0·26 per cent. boric acid, was faintly pink in colour, contained 40 warp threads and 28 weft threads to the inch and the nap had been raised on one side. The opinion was expressed that the lint had originally consisted of boric acid lint but it showed no evidence of being soiled. The bakery firm responsible for making the bread was prosecuted under section 2 and 113 (3) of the Act and the firm pleaded " guilty " and was fined £10. 0s. 0d. and £7. 15s. 0d. costs.

Bread, Sample No. S.7811

This sample also submitted as the result of a complaint consisted of 23 slices and the two end crusts of a sliced large white loaf. Eighteen of the slices and one end crust were discoloured with deposits of black material which was distributed unevenly over and through the slices. Altogether 9·65 grammes of the bread crumb were discoloured almost black with 0·17 gramme of mineral oil and 0·017 gramme of iron ; particles of cotton fluff were also present in the discoloured crumb. In this instance also the bakery firm was prosecuted under sections 2 and 113 (3) of the Act and at the hearing of the case the firm pleaded " guilty " and was fined £25 0s. 0d. and £9. 17s. 0d. costs.

Lemonade, Sample No. E,9875

This formal sample was taken by a County sampling officer from a part-filled bottle bearing a lemonade label in a public house following an incident in which a customer became acutely ill immediately after consuming part of a glass of shandy. Upon analysis the sample was found to consist of a solution of caustic soda containing 19·9 per cent. NaOH and it did not contain any lemonade. This solution was probably used to clean pipes and other equipment in the public house and had been placed in the lemonade bottle for this purpose without removing the lemonade label. It had then accidentally been used to make up a shandy although caustic soda is, of course, a very corrosive poison. Legal proceedings were instituted against the publican concerned who who at the hearing of the case pleaded " guilty " and was fined £25 0s. 0d and £9. 17s. 0d. costs.

Part of a Fruit Tart, Sample No. E.3360

This sample submitted as the result of a complaint consisted of three fragments of a fruit tart together measuring approximately $3\frac{1}{8}$ inches by $1\frac{7}{8}$ inches and weighing one ounce. The fruit filling was found to consist of apple pulp and there were traces of a cream-like substance on top of the filling. Upon examination it was found that there was a live growth of the grey mould Mucor racemosus over the whole of the moist exposed surface of the interior of the pastry case and on the fruit filling. Spores and mycelium were also found in the fruit filling itself. Legal proceedings were instituted under Section 2 of the Food and Drugs Act against the retail confectioner and he was fined £5 0s. 0d. together with £12 16s. 0d. costs.

Part of a Sliced Loaf, Sample No. E.3491

This complaint sample consisted of 15 slices and one end crust of a cylindrically shaped sliced loaf. Upon examination the end crust was found to contain a few fragments of tobacco some of which were charred. The adjacent slice also contained some fragments of tobacco and firmly embedded in the opposite side of this slice was part of a cigarette filter tip. The next slice also contained another portion of the filter tip. The parts of the filter tip contained a core of cellulose acetate surrounded by white paper with an outer covering of a coarser paper coated with what appeared to be finely ground cork. The sliced loaf had been purchased by the complainant from a branch shop of a firm of confectioners. Legal proceedings were instituted under Section 2 of the Food and Drugs Act against the firm concerned which at the hearing of the case pleaded " guilty " and was fined £20 0s. 0d. and £20 0s. 0d. costs.

Bread, Sample No. E.3942

This complaint sample consisted of the whole of a large white sliced loaf and it was found upon examination that of the 23 slices of bread (including the two end crusts) 20 were found to contain a total of 40 patches of a live and sporing green mould of a Penicillium species. Some of the patches of mould had penetrated through the affected slices and all the mould occurred either in the crust or the cut surfaces of the slices within about $\frac{1}{4}$ inch of the top or sides of the loaf. The loaf had been purchased from a branch of a supermarket and the bakery firm supplying the supermarket stated that the code number on the wrapper of the bread indicated that it had been baked one week before the day of purchase. Legal proceedings were instituted against the supermarket firm under Section 2 of the Food and Drugs Act and at the hearing of the case the firm pleaded " guilty " and was fined £20 0s. 0d. and £13 0s. 0d. costs.

Bread, Sample No. S.9102

This informal sample, submitted on complaint, consisted of 14 slices and the two end crusts from a large white sliced loaf. The slices were not all consecutive but due to a characteristic fold in the lower crust they all appeared to be from the same loaf. A slightly bent flat headed iron nail approximately 20·7 millimetres in length and weighing 0·25 gramme was found totally embedded in one of the slices, with its length in the plane of the cut surface of the slice, its point $\frac{1}{4}$ inch from the bottom crust and its length almost at right angles to the bottom crust. The nail was firmly embedded in and attached to the crumb of the loaf and the adhering crumb was stained reddish brown with rust. Legal proceedings were instituted under Section 2 of the Act against the firm responsible for making and selling the loaf, which at the hearing of the case pleaded " guilty " and was fined £20 0s. 0d. together with £10 18s. 0d. costs.

Milk, Sample No. E.2893

This sample consisted of a one-third pint bottle of school milk the metal foil cap of which had been perforated before it was submitted leaving a hole approximately half an inch in diameter. When received for examination the bottle was not quite full the level of the milk being approximately $\frac{3}{4}$ inch below the rim of the bottle. It was found that the contents of the bottle included a potato crisp plastic bag much of the coloured printing on which had been removed, a slightly tarnished, folded and used metal foil milk bottle cap and particles of coloured pigment from the plastic bag corresponding to six parts by volume of insoluble pigment per 100,000 parts by volume of the milk. As the

result of tests carried out on similar potato crisp bags and on milk bottle caps placed in one-third pint bottles, by passing them through a bottle washing plant, it was found that the condition of the plastic bag and the milk bottle cap found in the present sample was consistent with their having been in the bottle when it was passed through the bottle washing machine and being still present in the bottle when it was filled with milk. In view of the above findings legal proceedings were instituted under Section 2 of the Act against the dairy company which had supplied the milk to the school. At the hearing of the case the firm concerned pleaded " not guilty " but after hearing the evidence the case was found proved and the defendant company was fined £75 0s. 0d. and £19 10s. 0d. costs.

Milk, Sample No. S.9599

This sample also consisted of a one-third pint bottle of school milk which was submitted on complaint that a child drinking from the bottle with a straw had sucked up into her mouth a sliver of broken glass. When submitted the bottle contained five fluid ounces of milk and a drinking straw. Submitted separately was a fragment of broken glass measuring approximately 4·0 x 1·4 millimetres. Upon examination of the contents of the bottle five other particles of broken glass were found, the longest of which was 5·0 millimetres in length. The drinking straw was 3·5 millimetres in internal diameter and any of the six particles of glass could have passed through the straw, the greatest width of any of the particles being not more than 1·8 millimetres. The milk bottle itself was not chipped or broken but the density of all six fragments of broken glass, *viz.*, 2·513, was almost identical with that of the glass of the milk bottle. Legal proceedings were instituted under Section 2 of the Food and Drugs Act against the dairy company supplying the milk to the school and at the hearing of the case the firm pleaded " guilty " and was fined £15 0s. 0d. and £7 15s. 0d. costs.

Samples Containing Insects or Insect Remains

Twenty-eight Food and Drugs Act samples (23 County) were found to contain insects or insect remains during the year under review. This number is lower than that obtained during the year 1965 when 36 samples (32 County) were found to contain insects. In addition, one County sample was submitted during the year under review as a miscellaneous sample and is mentioned in Part VI of this report.

The insects found in the samples included the following :—eight samples contained beetles or beetle larvae of five identified and two unidentified species. Five samples contained moth larvae, of which three were identified but the species in the two remaining samples were

unidentified. Four samples contained ants, two samples each contained a cockroach and two samples each contained a slug. The following were found in one instance each in samples :—wasp, wood-louse, tick, mites, (Glycyphagus species), spider, crickets, parastic fly (Hymenoptera) larvae of large fruit fly (Trypetidae), window gnat, and one sample contained insect frass and webbing but no actual insects. In the following paragraphs mention is made of four samples (three County) which resulted in prosecutions.

Biscuit, Sample No. E.3219

This informal sample submitted as the result of a complaint consisted of an opened carton of slimming biscuits which had been resealed with adhesive tape. The outer wrapper appeared rather soiled and it had been damaged and perforated at one of the corners. Upon examination it was found that the carton contained 45 live beetles, three dead beetles and one fully grown live beetle larva, all of the species Ptinus tectus. This beetle is known as the Australian spider beetle, it is about 3·5 millimetres in length and is cosmopolitan in distribution. The filling of the biscuits was not damaged but the outer biscuit portions contained numerous holes many of which contained empty insect cocoons. The corrugated paper liner of the carton was perforated in several places and this also contained empty insect cocoons. This species of beetle normally lay its eggs in the spring and the larvae change into adult beetles either in the autumn or the following spring. The sample was purchased in April of the year under review and all the insects found in the carton appeared to be of one generation. There was a code number on a slip enclosed in the carton which, on enquiry from the manufacturers, indicated that the biscuits had been packed in November, 1962. The packet was, therefore, approximately three and a half years old and the result of the examination indicated that it had probably become infested in the Spring of the year 1965. In view of the above findings legal proceedings were instituted under Section 2 of the Food and Drugs Act against the retail vendor who at the hearing of the case pleaded " guilty " and was fined £25 0s. 0d. together with £13 0s. 0d. costs (£38 0s. 0d. in all).

Potato Crisps, Sample No. E.4251

This informal sample submitted as the result of a complaint consisted of an unopened packet of salted potato crisps which however was perforated in four places together with a number of minute perforations near the bottom of the packet. The general appearance of the packet indicated that it was old stock which had been kept under very unsatisfactory conditions. Upon examining the contents it was found that there were present 35 dead beetles and five dead beetle larvae and these,

as in the previously mentioned case, consisted of the species Ptinus tectus. Both the beetles and the larvae gave positive results when submitted to the phosphatase and peroxidase tests indicating that they had not been heated with the crisps. The crisps contained 28·4 per cent. of oil, 9·4 per cent. moisture and 1·4 per cent. salt. The dead beetles had absorbed a considerable amount of oil (22 per cent.) and some had salt crystals adhering to them. The moisture content of samples of potato crisps normally lies between 1·5 and 2·5 per cent. indicating that the sample under consideration had probably absorbed atmospheric moisture as the result of the packet being perforated. The packet was purchased at the end of October 1966 and it is probable that infestation occurred at least five to seven months earlier. In this instance also legal proceedings were instituted under Section 2 of the Food and Drugs Act against the retail vendor who at the hearing of the case pleaded " guilty " and was fined £50 0s. 0d. together with £18 5s. 0d. costs.

Fried Chipped Potatoes, Sample No. E.9879

This complaint sample consisted of a portion of fried chipped potatoes weighing 3·5 ounces among which was found the greater part (thorax and abdomen) of an adult female cockroach. The body of the cockroach was distended and upon analysis it was found to contain 49 per cent. of fat and it gave a negative result when submitted to the phosphatase test. The above findings are consistent with the cockroach having been immersed in hot fat. The two owners of the fish and chip shop from which the chipped potatoes had been purchased were prosecuted under Section 2 of the Food and Drugs Act and at the hearing of the case they both pleaded " guilty " and were fined £5 0s. 0d. each together with a total of £11 16s. 0d. costs (£21 16s. 0d. in all).

Part of a Meat and Potato Pie, Sample No. 901

This informal sample submitted by another Food and Drugs Authority as the result of a complaint consisted of part of a meat and potato pie and it weighed $2\frac{1}{4}$ ounces. Submitted separately with the sample were two parts of an insect which together were found to comprise almost the whole (thorax and abdomen) of an adult male cockroach. Washings from the outside of the insect fragments upon microscopical examination showed the presence of traces of heated wheat and potato starches and the insect fragments themselves gave negative results when submitted to the phosphatase test. These findings were consistent with the part cockroach having been present in the meat and potato pie before it was baked. Legal proceedings were instituted under Section 2 of the Food and Drugs Act against the baker who was also the retail vendor. At the hearing of the case he at first pleased " not guilty " but after hearing the evidence the plea was changed to " guilty " and he was fined £25 0s. 0d. together with £18 18s. 0d. costs.

Pesticide and Fungicide Residues in Foods

Chlorinated Pesticides.

The rapid development of Gas-Liquid Chromatography (G.L.C.) with electron capture detectors has led since 1961 to great improvements in the detection and determination of chlorinated pesticide residues in animal and vegetable products, especially at the lower levels of contamination. In this technique, purified solvent extracts from the food are injected into a stream of nitrogen gas just prior to its entry into a heated tube two feet to six feet long and $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter. This tube is packed with a porous inert material coated with a small quantity of a solvent of very high boiling point. Volatile components of the injected material are selectively retarded and separated by the film of stationary solvent as the gas carried them along the tube. Each compound has a constant retention time in the tube which depends chiefly on its boiling point and solubility in the stationary solvent. An ionisation device called an electron-capture detector is used to detect the separated compounds leaving the column. This detector is selectively sensitive to molecules containing chlorine atoms and usually detects less than one-thousand-millionth of a gramme of most chlorinated pesticides even in the presence of large amounts of vegetable and animal impurities.

Another technique for the separation and detection of pesticides called Thin Layer Chromatography (T.L.C.) has been developed rapidly over the last five years and is also in use in the County Laboratory. Layers of surface active material, such as silica gel or alumina, 0·25 mm. thick, supported on glass plates, act in a similar manner to the packed columns of the G.L.C. method described above. The mobile phase is a liquid solvent moving along the plate by capillary action and detection is by means of a silver nitrate spray followed by exposure to ultra violet light. The presence of chlorine-containing compounds is revealed by dark spots the position of which relative to the solvent front and to standards run on the same plate gives an indication of the pesticides present. This system although not quite as sensitive as the G.L.C. method can be used with greater amounts of extract material and, in fact, it is often used as a clean-up method before G.L.C. determinations. Neither the G.L.C. nor the T.L.C. method used alone gives entirely reliable evidence of the identity of the material causing the electrical signal or dark spot but by using the two methods in series good confirmation of the nature of the pesticide is possible.

Foodstuffs are also checked for toxic material by exposing thin films of their dried solvent extracts to fruit flies (Drosophila melanogaster) for several days. The flies are very sensitive to pesticides and are

killed by one-millionth of a gramme or less of most of the compounds in common use. This biological test gives a further check as to whether the chlorine compounds detected by G.L.C. or T.L.C. are in fact toxic materials.

The County Laboratory acquired G.L.C. equipment in September 1962 and further apparatus, which incorporates glass columns, was added during July of the year under review. In the last few years experience of methods of extraction and methods of " clean-up " of extracts of different types of foods has been built up so that we can now detect chlorinated residues of less than 0·01 p.p.m. by G.L.C. with confirmation by T.L.C. The County Laboratory is taking part in a national scheme for the testing of foodstuffs on a statistical sampling basis, organised by the County Councils Association in conjunction with the Association of Municipal Corporations and the Urban District Councils Association. Work on this started on the 1st August 1966 and in the last five months of the year under review 65 samples (54 County and 11 for Autonomous Authorities) were tested under the scheme. Results for chlorinated pesticide residues found in these samples and in ordinary Food and Drugs Act samples examined in 1966 are shown in table 23. A total of 127 samples were tested for chlorinated residues and of these 73 (57 per cent.) had detectable amounts of either B.H.C., D.D.T. products, aldrin or dieldrin but no significant amount of any other type of chlorinated pesticide residue was found.

Benzene Hexachloride

It will be seen from the table that residues of B.H.C. isomers were generally less than 0·1 p.p.m. except for a sample of mutton kidney fat. This was a sample of loin of lamb submitted with the kidney and associated fat. The kidney fat contained 12·0 p.p.m. B.H.C. isomers while the whole sample averaged 4·0 p.p.m., suggesting that the animal had been dipped or sprayed fairly recently before slaughter. Kidney fat from two other samples examined at the same time showed the presence of only 0·03 and 0·10 p.p.m. respectively of these isomers. All five samples of milk tested contained traces of B.H.C.

Aldrin and Dieldrin

The amounts of aldrin or dieldrin found were below 0·05 p.p.m. except for a lard with 0·06, beef with 0·09, butter with 0·18 and mutton kidney fat with 0·21 p.p.m.

D.D.T.

Traces of this insecticide, generally along with its break-down products or metabolites, D.D.E. and D.D.D., were found in approximately one-third of the samples. The sum, however, of these three

compounds was below 0·5 p.p.m. in each case except for a sample of mixed dried fruit and a sample of lard which contained 0·79 and 0·85 p.p.m. respectively.

In this country there are no statutory limits for organic pesticide residues in foods. Control is exercised mainly by published recommendations, for the use of pesticides on specific crops and at an adequate time before harvest, made by the Ministry of Agriculture, Fisheries and Food and by means of a voluntary Pesticides Safety Precautions Scheme agreed between Government Departments and Industry. The United States has tolerance levels for the above pesticides in many foods of :— D.D.T., 7 p.p.m., B.H.C., 5 p.p.m. and aldrin and dieldrin 0·1 to 0·25 p.p.m. These are the normal maximum levels of residues expected on crops grown in the U.S.A. when using the pesticides in accordance with good agricultural practice and allowing the recommended time interval between spraying and harvesting. The actual concentrations which have been shown to be harmful to the most sensitive test animals are higher than the above limits by a factor of at least one hundred.

The concentrations of the above four chlorinated pesticides found in the food products examined in 1966 were relatively low but it must be realised that they all tend to accumulate in human fat tissue and reach equilibrium at levels there very much higher than in the food intake. Thus the Government Chemist found average values for B.H.C. isomers of 0·42 p.p.m., dieldrin 0·26 p.p.m., and D.D.T. products 3·3 p.p.m., in samples of human fat examined in 1963/64. Until the significance of these residues in man can be properly assessed, a close watch must be kept on their concentrations in foods. In respect of this it has been pointed out elsewhere in this report that from June 1964 fertilisers to which aldrin or dieldrin has been added before purchase are no longer eligible for government subsidy. More recently, in January 1966, sheep dips containing dieldrin were withdrawn.

Organophosphorus Pesticides

G.L.C. with electron-capture detection is not as sensitive for organophosphorus products as for chlorinated compounds. It is hoped to remedy this next year by the use of a recently developed thermionic detector which is specific for phosphorus containing molecules. With the exception of one sample no evidence was found of significant amounts of organophosphorus residues in the foods examined. This was a sample of cabbage, the chloroform extract of which, after removal of the petrol soluble fraction, was toxic to Drosophila. A determination of the organic phosphorus showed the presence of water soluble organophosphorus compounds equivalent to 0·08 p.p.m. phosphorus.

Two samples of drinking water from a private upland surface supply were submitted to see whether there was any contamination from the use of sheep dip in the surrounding area. Carbophenothion (Trithion) was found by G.L.C. to the extent of 0·0017 and 0·007 p.p.m. respectively in the two samples.

Lead Arsenate

Thirty-six samples (32 apples and four pears) were tested for the presence of lead and arsenic residues from lead arsenate sprays used as a protection against codling moth and other fruit pests. Five of the samples contained lead residues, the values found being 0·09, 0·3, 0·5, 1·0 and 2·4 p.p.m.; these samples also had arsenic residues of 0·04, 0·1, nil, 0·2 and 0·8 p.p.m., as As, respectively. All the results were below the statutory limits of 3 p.p.m. for lead and 1 p.p.m. for arsenic.

Mercury

Forty-three samples (32 apple, four pear, six tomato and one egg) were found to be free from mercury residues.

Ortho-phenyl phenol and diphenyl

These fungicides are permitted for use within prescribed limits in certain fruits. The Preservatives in Food Regulations, 1962, prescribed the following limits for ortho-phenyl phenol : apples, pears and pineapples 10 p.p.m., peaches 20 p.p.m. ; melons 125 p.p.m., citrus fruit 70 p.p.m., and for diphenyl the limit is 100 p.p.m., in citrus fruit only.

All the appropriate samples of fruit were tested for these fungicides. Ortho-phenyl phenol was only detected in one sample of grapefruit, at 19 p.p.m. Diphenyl was found in four samples of oranges and four samples of grapefruit which contained levels between nine and 46 p.p.m.

Lettuce contaminated with Maneb

Two samples of lettuce were submitted from a field that was visibly contaminated by spray drift from a helicopter treating a potato crop in a near-by field. The spray used consisted of the fungicide Maneb, (the manganese salt of ethylene bisdithiocarbamate). The lettuce upon analysis were found to contain 3·1 and 1·5 p.p.m. of Maneb respectively, calculated on the whole sample, although most of the contamination was, in fact, on the outer leaves (31 p.p.m. on the outer leaves of the first sample). The U.S.A. tolerance for Maneb on lettuce is 10 parts per million and it was suggested that there would be no danger if the outer leaves were removed and not sold.

Table 23

Organochlorine Pesticides in Foods 1966
parts per million

Type of Sample	No. Examined	Total B.H.C. Isomers	D.D.T. including D.D.E. and D.D.D.	Aldrin and & Dieldrin	No. of samples with residues
Apples	32	0·014	0·004, 0·01, 0·01, 0·01, 0·02, 0·025, 0·09, 0·17, 0·18, 0·31, 0·36, 0·36, 0·8	0·01, 0·006	14
Bananas	3				0
Blackberries (canned)	1		0·019		1
Cherries	1		0·05		1
Damsons	1				0
Fruit, mixed, dried	1		0·79		1
Grapes	1		0·13		1
Gooseberries	3		0·02, 0·03 0·04		3
Plums	3		0·21		1
Pumpkin	1			0·03	1
Prunes (one canned)	2		0·06, 1·4		2
Pears	4		0·02, 0·36		2
Raisins	1		0·04		1
Strawberries (one canned)	4		0·04, 0·3, 0·4	0·002	3
Baby Food, canned Vegetables and Bacon	1			0·001	1
Baby Food based on dried Full Cream Milk Powder	1	0·035		0·011	1
Beef	7	0·003, 0·004, 0·006 0·012, 0·02, 0·045	0·003, 0·011, 0·011, 0·075	0·014, 0·02, 0·04, 0·09	7
Broad Beans (canned)	1	0·005	0·006		1
Beer	1				0
Bread	7	0·003, 0·006, 0·011, 0·02, 0·02 0·02, 0·06	0·058	0·001	7

Table 23—continued.

Type of Sample	No. Examined	Total B.H.C. Isomers	D.D.T. including D.D.E. and D.D.D.	Aldrin and & Dieldrin	No. of samples with residues
Blancmange Powder and Custard Powder	2				0
Breakfast Cereals	2	0·003			1
Butter	1		0·20	0·18	1
Chicken (whole)	1	0·02		0·02	1
Cabbage	3	0·06		0·004, 0·008	2
Cauliflower	2				0
Carrots	1			0·026	1
Eggs	1			0·012	1
Lard	2	0·11, 0·13	0·40, 0·85	0·06	2
Lettuce	1	0·03			1
Liver	1	0·014	0·06		1
Margarine	1		0·21		1
Mushrooms, (canned)	2				0
Milk	5	0·002, 0·004, 0·008, 0·008, 0·008		0·004	5
Mutton Kidney fat	3	0·03, 0·10 12·0	0·12	0·04, 0·21	3
Onions (fresh)	1				0
Oatmeal	3				0
Peas (dried)	1				0
Potatoes	5	0·03		0·0045, 0·007	2
Rice	1				0
Sauerkraut (canned)	1	0·002			1
Soup Mix, Vegetable, (dried)	1				0
Sprouts	1	0·06			1
Sugar, white	1				0
Tomato Puree (canned)	1				0
Tea	1		0·35		1
Tomatoes	6				0
Total	127				73

Drugs

During the year under review 590 samples (508 County) of drugs were submitted for examination as compared with 663 samples (551 County) during the year 1965. The samples mainly comprised articles which are the subject of monographs in the British Pharmacopoeia or the British Pharmaceutical Codex but also included a number of proprietary drugs and four samples of herbal remedies. They, therefore, included such substances as olive oil, arrowroot, gelatine and malt extract with cod liver oil which can also be regarded as foods, as well as a relatively large number of traditional drugs such as aspirin tablets, epsom salts, tincture of iodine, etc. Some 244 of the samples (207 County) consisted of modern official or proprietary drugs ; for example, penicillin preparations, Butazolidin tablets, Lysivane tablets, etc. During the year under review 21 samples (19 County) were reported upon adversely. The majority of the unsatisfactory samples consisted of traditional drugs but they did include nine modern official or proprietary drugs all of which were County samples. All the samples of drugs examined for the County during the year under review are listed alphabetically with other samples in table 3 and particular attention is directed to the list of proprietary drugs given on page 26. Brief mention is made in the following paragraphs of each of the samples which were reported upon adversely. It will be seen that in some cases the compositions of the samples were seriously at fault, in others the labels were incorrect while in several instances there were only slight discrepancies in composition.

Ground Arrowroot, Sample No. N.5564

This informal sample obtained from a school kitchen was found to be in relatively hard lumps and it had the appearance of old and badly stored stock although when examined its moisture content was only 14·5 per cent. (B.P.C. maximum limit 16·0 per cent.). The attention of the supervisor of the school kitchen was drawn to the condition of this commodity.

Junior Aspirin Tablets, Samples Nos. C.1810 and C.2195

These two informal prepacked samples purchased from two different pharmacists' shops were both found upon analysis to contain excessive amounts of free salicylic acid. Sample No. C.1810 contained approximately three times and sample No. C.2195 approximately two and a half times the maximum limit (equivalent to 0·16 per cent.) for free salicylic acid prescribed in the B.P.C. for soluble aspirin tablets for infants. Sample No. C.1810 was in particularly bad condition the tablets all adhering together and there was evidence that some of the caps

on the remaining bottles at the pharmacist's shop were not firmly screwed down. The remainder of the stock was destroyed and the pharmacist brought this matter to the attention of the suppliers of the tablets. In the case of sample No. C.2195 the sampling officer interviewed the pharmacist and the remainder of his stock of this commodity was withdrawn from sale.

Aspirin tablets B.P., sample No. 846

This informal sample, submitted by an Autonomous Food and Drugs Authority, and purchased on the 16th February, 1966, was found to consist of, and was labelled as, five grains tablets. Five grains of aspirin are equivalent to 324 milligrams per tablet. The B.P. Addendum 1964, however, requires that from the 31st January, 1966, B.P. Aspirin tablets sold by a retail dealer shall conform to a metric and not an Imperial standard and shall contain 300 milligrams of aspirin per tablet (limits 285 to 315 milligrams). The retailer and the packers were communicated with and informed of the new requirements of the B.P.

Borax, Samples Nos. C.2150 and C.2888

The first of these informal samples was simply labelled "refined borax" but the other sample was labelled "Borax B.P." Borax contains ten molecules of water of crystallisation but effloresces in dry air with the result that under these conditions it becomes more concentrated. The B.P. requires borax when assayed by the official method to contain not less than 99·5 per cent. and not more than the equivalent of 103·0 per cent. of $Na_2B_4O_7$ 10 H_2O. When assayed by this method the first of the above samples was found to contain the equivalent of 128·0 per cent. of the hydrated salt while the second sample contained the equivalent of 105 per cent. In view of the fact that the first sample was not labelled to be of B.P. quality and that in the case of the second sample the excess was relatively slight no action was advised in respect of either sample.

Boric Acid B.P. Sample No. E.3618

Boric Acid B.P. is required to contain not less than 99·5 per cent. of H_3BO_3 but the above informal sample was found upon analysis to contain only 98·2 per cent. The pharmacist from whom the sample was purchased was communicated with, informed of the result of the assay and advised to delete the letters "B.P." from the remaining cartons of this product.

Boracic Ointment, Sample No. C.2423

This informal sample of a proprietary brand of boracic ointment bore a label which declared the active constituents to be 1·0 per cent. boric acid and 0·25 per cent. chlorinated cresols. Upon analysis, however, it was found to contain 1·1 per cent. of boric acid and only 0·14 per cent. of chlorinated cresols calculated as monochlorinated cresol. A sample of the same product analysed earlier in the year had been found to be satisfactory. The manufacturers were communicated with and their attention drawn to the deficiency in chlorinated cresols found in samples No. C.2423.

Cough Syrup, Sample No. N.5297

This informal prepacked sample bore a list of active constituents which included Liquid Extract of Quillaia 0·045 per cent. Quillaia is a frothing agent which contains saponin glycosides and, in the opinion of your analyst, it is an undesirable ingredient for internal use because it is a powerful internal irritant and has a marked haemolytic action. This opinion is supported by the facts that other Food and Drugs Authorities have objected to its use, the British Pharmaceutical Codex 1954, drew attention to its irritant and haemolytic action and in the U.S.A. its presence in food is regarded as adulteration. The manufacturers of this product were communicated with and it transpired that the above sample must have been at least 18 months old as the use of Quillaia had been discontinued for that length of time.

Cough Mixture, Sample No. 33

This informal prepacked sample, submitted by an Autonomous Food and Drugs Authority bore a detailed formula which contained the ingredient Formaldehyde 0·02 per cent., but the label also bore the statement " Free from Poison." Although the amount of formaldehyde present was small this substance is an irritant as well as being a powerful antiseptic. Because of its irritant nature and its action on protein it is not permitted as a preservative in food in this country and it is listed as a Part II Poison under the Pharmacy and Poisons Act, 1933. Under these circumstances the statement " Free from Poison " was not strictly correct. This discrepancy in the label was brought to the attention of the vendor, under whose name the product had been sold, and he withdrew the remainder of the stock, which was small, from sale.

Gelatine, Sample No. C.2670

This informal County sample was one of four ingredients taken on the premises of an ice-cream manufacturer, following the finding of a few particles of tinned iron in two samples of ice-cream (Nos. 100/2 and 101/2) submitted by an Autonomous Food and Drugs Authority. The sample of gelatine weighed seven ounces and it also was found to contain some particles of tinned iron weighing a total of 1·2 milligrams, the largest particle of metal being approximately one millimetre square. As a result of the above findings the remainder of the stock of gelatine in the possession of the ice-cream manufacturer was destroyed.

Standardised Senna Tablets, Sample No. S.8227

This informal prepacked sample bore a label which stated that the contents contained 50 tablets. Upon examination however, it was found that only 43 tablets were present. The retail pharmacist concerned was communicated with and he, in turn, brought this discrepancy to the notice of the manufacturers and packers of the tablets. It transpired that packing had been carried out by means of a semi-automatic counting machine and it had been found that this has resulted in a proportion of both overfills and underfills. Steps have now been taken to improve accuracy in counting and to eliminate underfills.

Medicine, Sample No. S.8857

This four ounce bottle of medicine dispensed under a National Health Prescription was submitted as the result of a complaint. Upon analysis the medicine was found to have the composition of Opiate Squill Linctus for Infants but the liquid also contained the dead body of a spider weighing 10 milligrams. In view of the origin of the medicine the above findings were brought to the notice of the Clerk of the Local Executive Council for his information and any action considered necessary.

Proprietary Sulphonamide Suspension, Samples Nos. E.2759 and N.5477

These two informal samples purchased at two different Pharmacists' shops were found upon examination to contain only 442 and 440 milligrams of sulphonamides respectively per 5 millilitres of the preparation. This suspension should contain 500 milligrams of sulphonamides per 5 millilitres. Preparations of this type are difficult to dispense correctly because of the insoluble nature of the active constituents and their tendency to sediment out. Further samples were requested from both stocks ; in the first instance, however, a further sample was unobtainable but in the case of sample No. N.5477 another sample from the same stock, after the pharmacist had been interviewed, was found to be satisfactory in composition.

Proprietary Sulphonamide Suspension, Sample No. N.5464

This informal sample purchased on prescription should have consisted of a suspension based on the three sulphonamides, sulphamerazine, sulphadiazine and sulphadimidine. Upon analysis, however, these sulphonamides were found to be absent and the sample was found to contain 9·2 per cent. of succinyl-sulphathiazole and 8·8 per cent. of kaolin in a chocolate flavoured suspension. The preparation named in the original prescription does not contain kaolin. The pharmacist concerned was interviewed by the sampling officer and it appeared that the mistake was due to the similarity in names and because he happened to have the second preparation in stock.

Proprietary Sulphonamide Suspension, Sample No. N.5533

In the case of this informal sample there was a technical error on the label in that one of the active constituents was described as " sulphamerazine B.P." whereas sulphamerazine had been deleted from the 1963 edition of the British Pharmacopoeia. No action was advised in respect of this sample.

Proprietary Travel Sickness Tablets, Samples Nos. C.2147. S.8147 and S.8253.

These informal samples of the same proprietary brand of travel sickness tablets were purchased from three different pharmacists. These tablets should contain 25 milligrams of promethazine chlorotheophyllinate per tablet and upon analysis all three samples were found to be satisfactory in composition. The Seventh Schedule of the Pharmacy and Poisons Act, however, required the above mentioned active constituent when used for the purpose of these tablets to bear on the label special cautionary wording in place of the word " Poison." The wording to be used here is " Caution. This may cause drowsiness. If affected, do not drive or operate machinery." This wording did not appear on the labels attached to any of the above samples and the pharmacists concerned were informed of the requirements of the Act.

Cough Linctus, Sample No. C.3140.

This informal sample obtained at a pharmacist's shop had been purchased as a proprietary brand of cough linctus based on Pholcodine. Upon analysis, however, it was found that it did not have the characters of the linctus in question. Upon further examination it was found to contain ephedrine, caffeine, salicylates and iodide and it had the characters and composition of a proprietary brand of elixir ephedrine compound. The pharmacist from whom the purchase had been made was cautioned with regard to this instance of incorrect dispensing.

Prosecutions

When the adulteration of a sample is considered to be sufficiently serious, legal proceedings are instituted. Prosecution, however, is only one of the means of dealing with adulterated or otherwise unsatisfactory samples. A perusal of tables 10 and 21, which are concerned with the various types of milk adulteration and sophisticated samples other than milk, respectively, shows that many of the samples are only slightly adulterated. In the case of food and drug samples, other than milk, deterioration may be due to long storage or adulteration may be brought about by the action of some person other than the actual vendor. In these instances it is often considered appropriate to take less drastic action than legal proceedings. In the case of milk samples vendors are sometimes cautioned and subsequent samples then frequently prove to be genuine ; in other instances dairies are visited by the Sampling Officers in order to correct faulty dairy management which has given rise to unsatisfactory samples. In the case of other foods and drugs appropriate action may take the form of the surrender for destruction of the remainder of any unsatisfactory stocks, returning stocks to manufacturers or communicating with packers with regard to unsatisfactory labels, etc.

During the year a total of 436 County food and drugs samples were reported upon adversely and in respect of 44 of these prosecutions were instituted. Twenty-eight samples consisted of milk and of these three were deficient in fat, twelve contained extraneous water, six contained

penicillin, four were deficient in fat and contained extraneous water, two contained fragments of broken glass and one contained an empty potato crisps plastic bag. In addition to the above, two samples of Channel Islands Milk were the subject of legal proceedings, one containing extraneous water and the other containing penicillin. As regards other types of samples, a sample of Sweets contained a piece or iron wire, a sample sold as Lemonade was found to consist of a solution of caustic soda, a sample of Pickles had an excess of sulphite preservative and was incorrectly labelled, a Fruit Tart and a sample of Bread were each infested with mould. Of four other samples of Bread which were the subject of legal proceedings one contained frgaments of absorbent cotton lint, one contained mineral oil, iron and a small amount of cotton fluff, another contained a flat headed iron nail and the last contained the filter-tip of a smoked cigarette. Two other samples which resulted in successful legal proceedings were each submitted as cans of Baked Beans with Tomato Sauce, but on examination one was found to be a brand of cat food and the other a brand of dog food. Finally, three other samples contained insects and as a result successful legal proceedings were instituted. There were 44 convictions or orders to pay costs. The total fines and costs during the year amounted to £930 6s. 6d. In table 24 will be found similar information for the years 1912–1966 inclusive and it will be noted that the total fines and costs during the year under review is the highest since the year 1946.

Table 24

County Fines and Costs during the Years 1912-1966

Year	Number of Prosecutions	Convicted or ordered to pay costs	Dismissals, etc.	Fines and Costs £ s. d.
1912–1936 ...	1,526	1,322	204	6,346 16 4
1937	39	36	3	165 1 0
1938	26	24	2	132 10 1
1939	19	18	1	100 11 6
1940	25	23	2	171 14 0
1941	84	79	5	824 13 2
1942	38	36	2	502 4 10
1943	54	49	5	375 10 11
1944	38	37	1	291 19 6
1945	33	33	0	365 4 6
1946	94	92	2	936 7 9
1947	98	93	5	667 7 0
1948	70	69	1	703 0 6
1949	48	45	3	518 17 2
1950	43	42	1	405 8 7
1951	50	39	11	362 11 6
1952	65	64	1	620 13 0
1953	54	53	1	576 12 8
1954	45	45	0	294 9 6
1955	42	41	1	261 7 6
1956	20	19	1	185 13 6
1957	21	18	3	371 1 0
1958	27	26	1	270 4 7
1959	17	17	0	279 13 0
1960	16	16	0	232 14 0
1961	30	30	0	350 5 2
1962	32	32	0	363 16 0
1963	28	28	0	494 16 9
1964	32	32	0	474 2 0
1965	33	33	0	656 2 10
1966	44	44	0	930 6 6
Total ...	2,781	2,535	256	19,231 16 4

Table 25

Prosecutions arising out of Samples obtained during the year 1966.

District	Number of Prosecutions	Convicted or ordered to pay costs	Dismissals, etc.	Fines and Costs £ s. d.
Ashton-in-Makerfield U.D.C.	1	1	—	24 17 0
Atherton U.D.C.	4	4	—	75 2 0
Bacup Borough	1	1	—	9 15 0
Blackburn R.D.C.	3	3	—	28 10 0
Carnforth U.D.C.	1	1	—	5 13 0
Chadderton U.D.C.	1	1	—	23 0 0
Chorley R.D.C.	3	3	—	31 19 0
Clitheroe R.D.C.	2	2	—	21 6 0
Crompton U.D.C.	1	1	—	19 17 0
Denton U.D.C.	4	4	—	233 15 0
Lees U.D.C.	1	1	—	34 17 0
Littleborough U.D.C. ...	2	2	—	42 15 0
Longridge U.D.C.	3	3	—	27 15 0
Padiham U.D.C.	1	1	—	14 17 0
Preston R.D.C.	2	2	—	42 12 0
Radcliffe Borough	6	6	—	104 4 0
Warrington R.D.C.	1	1	—	30 18 0
Westhoughton U.D.C. ...	1	1	—	39 17 0
West Lancs. R.D.C.	3	3	—	54 8 6
Whiston R.D.C.	1	1	—	34 17 0
Wigan R.D.C.	2	2	—	29 12 0
County Districts	44	44	—	930 6 6
Autonomous Authorities ...	16	16	—	143 1 6
Total All Sources	60	60	—	1,073 8 0

PART II

THE MILK (SPECIAL DESIGNATION) REGULATIONS, 1963

AND

THE MILK (SPECIAL DESIGNATION) (AMENDMENT) REGULATIONS, 1965

Phosphatase Test, Half-hour Methylene Blue Test, Turbidity Test and The Colony Count Test

The above Regulations were made jointly by the Minister of Health and the Minister of Agriculture, Fisheries and Food. The Special Designations permitted prior to the year 1965 were, for raw milk, "Tuberculin Tested" and for heat-treated milk, "Pasteurised," "Sterilised" and "Tuberculin Tested Milk (Pasteurised)." The 1963 Regulations permitted a licence holder authorised to use the special designation "Pasteurised" to also use until the 31st December, 1964, the special designation "Tuberculin Tested Milk (Pasteurised)." The 1963 Regulations replaced, from the 1st October, 1964, the special designation "Tuberculin Tested" by the special designation "Untreated" but the former designation was permitted, as an alternative, on containers until the 31st December, 1964. Apart, therefore, from the new special designation mentioned in the next paragraph, the only special designations which have been permitted since the 1st January, 1965 are "Untreated," "Pasteurised" and "Sterilised."

The 1965 Amendment Regulations introduced, from the 1st October, 1965, an additional special designation of "Ultra Heat Treated" in relation to which caps of containers must be marked either "Ultra Heat Treated Milk" or "U.H.T. Milk." It should be mentioned, however, that the test prescribed for Ultra Heat Treated Milk in the Regulations is a colony count test which is purely bacteriological in nature and which will not, therefore, be carried out in the County Laboratory.

All producers' licences are granted by the Minister of Agriculture, Fisheries and Food but since the 1st January, 1961, all dealers' licences to sell milk or heat-treated milk have, subject to certain exceptions, been granted by Food and Drugs Authorities.

The tests described in the 1963 Regulations are :—

The Methylene Blue Test for Pasteurised Milk and for Untreated Milk. This test indicates the probable quality of the milk at the time of its use by the consumer and it depends on the decolourisation of methylene blue by bacteria and reducing substances present in the milk. It is a half-hour test for both the above types of milk, whereas under the

1949 Regulations raw tuberculin tested milk was submitted to a $4\frac{1}{2}$ hour or $5\frac{1}{2}$ hour test depending on the time of year. The test is similar, but the conditions are more stringent, to the half-hour methylene blue test applied under the 1949 regulations to pasteurised milk. The test is designed to ensure that milk will keep fresh, if kept reasonably cool, until the next day's supply is received by the consumer. With this end in view samples taken from 1st May to 31st October are kept at atmospheric shade temperature until 9.30 a.m. the following day. Samples taken from 1st November to 30th April inclusive are kept at atmospheric shade temperature until 5 p.m. on the day of sampling and then at a constant temperature of 65°F. $\pm$ 2°F. until 9.30 a.m. the next day. The test with the methylene blue solution is carried out for 30 minutes at between 37-38°C. and must be commenced between 9.30 and 10.0 a.m. on the day after the sample was taken.

If the atmospheric shade temperature at any time exceeds 70°F. the test shall not be applied. This is a more realistic summer shade temperature than that prescribed in earlier regulations when 65°F. was the maximum limit for the storage temperature (pasteurised milk only). It was, in fact, found that the majority of samples passed the test even when the maximum shade temperature exceeded 65°F. but, because of the limit imposed, the tests had to be declared void.

The Phosphatase test for Pasteurised milk. This test indicates whether heat treatment has been adequate to destroy pathogenic organisms. The Aschaffenburg-Mullen phosphatase test is now used and it depends on the liberation by the enzyme phosphatase of p-nitrophenol from the buffer-substrate solution. Phosphatase is always present in raw milk but it is almost entirely destroyed by the amount of heat treatment necessary for efficient pasteurisation. The test prescribed in the 1949 regulations was the Kay-Graham test which depends on the liberation of free phenol from the appropriate buffer substrate solution.

The present test has several advantages. Incubation at 37°C. is only necessary for two hours instead of 24 hours. The test can, therefore, often be completed on the day of sampling. There is far less likelihood of incorrect results being obtained due to contamination with phenol or the presence of phenol-producing organisms in the milk, as p-nitrophenol is not in common use in a laboratory and is not produced by bacteria. It is only necessary, therefore, to carry out a blank and test the colour of the buffer substrate solution for absence of free p-nitrophenol, whereas previously it was also necessary to carry out a control test on each milk to check the absence of free phenol and phenol-producing organisms.

The test is satisfied by milk which gives a colour reading after incubation for two hours corresponding to the liberation of not more than 10 ug of p-nitrophenol per ml. of milk. As a general guide to samples that fail the test it may be said that samples which show more than 10 and up to 18 ug are slightly under-pasteurised or contain a small quantity of raw milk (0·1-0·2 per cent.). Samples showing more than 18 and up to 42 ug are under-pasteurised or contain a small quantity of raw milk (up to 0·5 per cent.). Samples showing more than 42 ug are grossly under-pasteurised or contain an appreciable quantity of raw milk. Raw milk would give a colour equivalent to several thousand micrograms of p-nitrophenol which would not be directly matchable.

The Turbidity test for Sterilised Milk. This test indicates whether sterilisation has been efficient and it is identical with that prescribed in earlier regulations. It depends on the fact that heating to not less than 212°F. for a period sufficient for effective sterilisation will also completely denature all the soluble protein of the milk. Samples which show the presence of soluble protein after submission to the test are insufficiently heated or contain raw milk.

The conditions for the heat treatment of milk prescribed in the Regulations are as follows :—Pasteurised milk must have been treated by one or other of the following processes :—

(*a*) Retained at a temperature of not less than 145°F. and not more than 150°F. for at least 30 minutes and be immediately cooled to a temperature of not more than 50°F. ; or

(*b*) Retained at a temperature of not less than 161°F. for at least 15 seconds and be immediately cooled to a temperature of not more than 50°F. ; or

(*c*) Retained at such temperature for such period as may be specified by the licensing authority with the approval of the Minister.

Sterilised milk must have been filtered or clarified, homogenised and thereafter heated to and maintained at such a temperature, not less than 212°F., for such a period as to ensure that it will comply with the turbidity test prescribed.

Ultra Heat Treated Milk must be retained at a temperature of not less than 270°F. for not less than one second and then immediately placed, under aseptic conditions, into the sterile containers in which it is to be supplied to the consumer.

With regard to the taking of samples the Regulations state that these may be taken at any time when the milk is in the possession of the licensed producer, pasteuriser, steriliser or dealer. Unopened bottles shall be delivered intact as samples to the testing laboratory but where

the milk (other than U.H.T. milk) is in containers exceeding one quart in capacity samples shall consist of not less than two fluid ounces of the milk and shall be taken, using aseptic precautions, from well below the surface of the milk and transferred to a sterile stoppered bottle. Instructions are given in the regulations with regard to the marking of samples and all samples shall be placed, immediately after taking, in an insulated container which shall not be artificially cooled and they shall be transported to the testing laboratory with the least possible delay. Samples must arrive at the laboratory on the day they were taken, otherwise they must be discarded.

The Milk (Special Designations) (Specified Areas) Orders.

The sequence of events since the year 1943, which has resulted in the making of a number of Milk (Special Designations) (Specified Areas) Orders, thereby prohibiting the sale for human consumption of raw undesignated milk in the areas specified, was given in some detail in this report for the year 1958. It is perhaps sufficient to say here that Section 37 of the Food and Drugs Act, 1955, makes it compulsory to use special designations in areas which have been made specified areas by orders made under Section 41 of the Act. The special designations which may be used in a specified area are " Pasteurised," " Sterilised " " Untreated " and " Ultra Heat Treated."

The first Milk (Special Designations) (Specified Areas) Order which affected parts of the area of the County Food and Drugs Authority came into operation on the 1st November, 1952. Nine other Orders, similarly affecting parts of the County, have come into operation since. By the 10th April, 1961, all the 91 County districts in the County Food and Drugs Area had become specified areas. In view of the fact that it is the duty of the Food and Drugs Authority to enforce the provisions of Section 37 of the Food and Drugs Act, 1955, it follows from the above that a substantial number of samples of special designation milks are now being taken by County Sampling Officers for submission to the County Laboratory for examination by the statutory Phosphatase, Half-hour Methylene Blue or Turbidity tests.

During the year 1,646 samples of heat-treated milk were submitted for examination by the Phosphatase Test, the Half-hour Methylene Blue Test or by the Turbidity Test. The samples were marked either Pasteurised or Sterilised and tables 26, 27 and 28 give particulars of the results obtained. Of these, as will be seen from the tables, six samples failed the Phosphatase test and ten samples failed the Half-hour Methylene Blue test. One of the six samples which failed the Phosphatase test was taken at a pasteurising plant. None of the ten samples which failed the Half-hour Methylene Blue test were taken at pasteurising plants. In addition, 230 samples of Untreated milk were submitted

for the Half-hour Methylene Blue test and of these 14 failed to pass the test. One of the samples of Untreated milk was also submitted to the Phosphatase test and it gave a result consistent with it being Untreated milk.

Table 26

Phosphatase Tests, 1966

Type of Milk	Number Submitted	Number unsatisfactory			
		Group 2	Group 3	Group 4	Total
Pasteurised	1,264	1	3	2	6
Untreated	1	0	0	0	0
Totals	1,265	1	3	2	6

Table 27

Half-hour Methylene Blue Tests, 1966

Type of Milk	Number submitted	Number unsatisfactory
Pasteurised	1,269	10
Untreated	230	14
Totals	1,499	24

Table 28

Turbidity Tests, 1966

Type of Milk	Number submitted	Number unsatisfactory
Sterilised ...	... 377	0

PART III.—THE FERTILISERS AND FEEDING STUFFS ACT, 1926

The Fertilisers and Feeding Stuffs Act, 1926, came into force on 1st July, 1928. It is intended to safeguard the purchasers of substances used for the fertilisation of the soil and for the feeding of cattle and poultry.

The general purpose of the Act, like that of the Act of 1906, which it repealed, is to provide civil remedies for the misdescription of, and to prevent fraud in, fertilisers and feeding stuffs. Its scope is defined by Regulations made by the Minister of Agriculture, Fisheries and Food.

In addition, Regulations were made by the Minister of Health during the years 1953, 1954 and 1958 (in exercise of powers first conferred by Section 2 of the Therapeutic Substances (Prevention of Misuse) Act, 1953, now replaced by Section 9 of the Therapeutic Substances Act, 1956), which permit the use of certain antibiotics, *viz.*, penicillin, aureomycin, streptomycin and oxytetracycline in pig foods and poultry foods and for horticultural purposes. These Regulations prescribe conditions with regard to labelling and also specify in regard to pig and poultry foods maximum limits for the amounts of the prescribed antibiotics which may be present.

It has already been mentioned that the scope of the Fertilisers and Feeding Stuffs Act is defined by Regulations. The Regulations at present in force are the Fertilisers and Feeding Stuffs Regulations, 1960. These were made following a general review by the Standing Advisory Committee of the previous regulations, including the previously prescribed methods of analysis. An amendment was made to the Regulations during the year 1962 in that the Fertilisers and Feeding Stuffs (Amendment) Regulations, 1962, now permit the third part of a sample taken by an official sampler or inspector under the Act to be sent to the appropriate person specified in the Regulations by the recorded delivery service as an alternative to registered post.

Another amendment was made in 1964 and this, The Fertilisers and Feeding Stuffs (Amendment) Regulations, 1964, came into operation on the 1st March, 1964. The effect of these regulations was to bring nitrogenous gas liquor, ammoniacal gas liquor and gas liquor within the scope of the Fertilisers and Feeding Stuffs Act and to prescribe a method of analysis and limits of variation. The regulations also amended the definition and limits of variation for bone meal, and altered the limit for free acid in sulphate of ammonia below which it is not required that the percentage of free acid shall be declared. The definitions of dried grass and other dried green crops were amended and the references

to potassium salts in the First and Fourth Schedules to the principal regulations were also amended. The method for the preparation of a sample in the solid form for the determination of sugar was revised. Finally, provision was made for the marking and sampling of liquid fertilisers in bulk containers or tankers.

No amendments were made to the regulations during the year 1966 but it is understood that the Standing Advisory Committee is continuing its review particularly in regard to the possible inclusion of regulations covering trace elements, prophylactics and other additives.

In a Review of the Persistent Organochlorine Pesticides published in February, 1964, by the Advisory Committee on Poisonous Substances used in Agriculture and Food Storage, it was recommended that the use of aldrin and dieldrin in fertiliser mixtures should cease as soon as this could be arranged. These two pesticides are related as aldrin is converted into dieldrin in the animal body and in the soil. Dieldrin is persistent in soils for a number of years and the annual application of aldrin or dieldrin with fertilisers to soils is quite unnecessary for pest control and could lead to undesirable accumulations in soils. Following this recommendation the Fertilisers (United Kingdom) Scheme, 1964, made under the Agriculture (Fertilisers) Act, 1952, stipulated that fertilisers to which aldrin or dieldrin had been added before purchase would not be eligible for government subsidy. This restriction has been continued in the Fertilisers (United Kingdom) Scheme, 1966.

Fifty samples have been examined for the County during the year under review. Of these, 20 were fertilisers and 30 consisted of feeding stuffs. The fertilisers comprised 11 formal samples and nine informal samples. All the feeding stuff samples were formal. No prosecutions were instituted in respect of fertiliser or feeding stuff samples during 1966.

In addition, 64 samples (3 formal and 61 informal) were examined for Autonomous Authorities. Of these, 21 samples (all informal) were fertilisers and 43 (3 formal and 40 informal) consisted of feeding stuffs.

Of the 20 samples of fertilisers examined for the County 16 were found upon analysis to be correct within the limits of variation permitted by Regulations made under the Act and four showed minor deviations outside the permitted limits of variation which, in your analyst's opinion, were unlikely to be to the prejudice of the purchaser. In addition one of the 16 samples which were correct within the permitted limits of variation had a voluntary declaration of neutralising value which was found to be 3·6 per cent. less than that actually present.

Of the 30 samples of feeding stuffs examined for the County, 25 were found to be correct within the permitted limits of variation and the remaining five showed only minor deviations outside the permitted limits. In addition, however, four of the samples of pig meal showed the presence of amounts of copper varying from 80 to 120 parts per million. These figures are in excess of the amounts normally associated naturally with the ingredients and as copper is a potentially deleterious ingredient its presence should, in the opinion of your analyst, have been declared. In only one of the four instances mentioned was the presence of added copper actually declared. Finally, in respect of four of the samples of feeding stuffs the copies of the particulars applying to the samples were not in the precise form required by Part II of the First Schedule to the Fertilisers and Feeding Stuffs Act, 1926, in that in each the amount of " protein " and not of " albs " should have been included.

The analytical results obtained on all the County samples examined during the year together with the guaranteed figures contained in the Statutory Statements, are given in the following two tables.

Table 29

Fertilisers

Sample Number District and Description	Formal or Informal	Per cent. Nitrogen		PER CENT. PHOSPHORIC ACID (P_2O_5)								Per cent. Potash K_2O		Other Figs. per cent.
				Total		Soluble		Insoluble		Soluble in Citric Acid				
		G	F	G	F	G	F	G	F	G	F	G	F	
9/2/B Skerton Sulphate of Potash	I											50·0	49·25	
10/2/B Skerton Super phosphate	I					18·5	18·7							
3/7/B Bolton Bone Meal	I	3·7	3·9	20·5	21·0									
4/7/B Bolton Toprose Fertiliser	I	5·0	5·1		7·2	5·0	4·2	1·0	3·0			12·0	12·1	
17/2/A Skerton "—" Growmore	F	7·3	7·1		10·1	7·4	7·0	2·7	3·1			7·5	7·65	
18/2/A Skerton "—" Potato Manure	F	7·5	7·25		8·9	6·5	6·3	2·9	2·6			12·0	11·4	
10/8/A Rochdale Lawn Sand	F	8·2	7·2											
2/8/B Rochdale "—" Ten-day Fertiliser	I	9·0	8·8		5·0	5·0	4·65		0·35			4·0	4·5	

Table 29—continued

Sample Number District and Description	Formal or Informal	Per cent. Nitrogen		PER CENT. PHOSPHORIC ACID (P_2O_5)								Per cent. Potash K_2O		Other Figs. per cent.
				Total		Soluble		Insoluble		Soluble in Citric Acid				
		G	F	G	F	G	F	G	F	G	F	G	F	
7/11/A Widnes Nitro 26 Fertiliser	F	26·0	25·7											
8/11/A Widnes "—" 53 Fertiliser	F	12·0	12·3		24·9	22·8	23·7	1·2	1·2				0·2	
37/10/A Seaforth "—" Manure	F	8·0	8·6		4·0	2·0	1·7	2·0	2·3			4·2	3·9	
38/10/A Seaforth "—" Turf Manure	F	8·0	9·4		4·1	2·0	2·1	2·0	2·0			4·2	4·15	
3/6/B Leyland Ten-day Fertiliser	I	9·0	8·9			5·0	5·05		Nil			4·0	4·25	
4/6/B Leyland General Fertiliser	I	4·0	4·4		5·05	5·0	4·5	1·0	0·55			5·0	4·5	
11/2/B Lonsdale Lawn Fertiliser	I	7·0	7·75	4·5	4·6	3·75	2·9	0·75	1·7			4·5	4·85	
19/2/A Lonsdale "—" Nitro-Chalk	F	21·0	20·7											A
10/4/A Lower Blackburn Bone Meal	F	3·7	4·35	20·6	22·5									
11/4/B Lower Blackburn Lawn "Plus"	I	5·10	5·6		6·2	5·75	5·3	1·00	0·9			8·10	7·55	
39/10/A Seaforth "—" Turf Manure	F	8·0	8·5		4·4	2·0	2·2	2·0	2·2			4·20	3·8	
40/10/A Seaforth "—" Winter Turf Manure	F	3·2	2·9		5·7	3·0	3·0	2·2	2·7			10·4	10·3	

G — Guaranteed.

F — Found.

A — Guaranteed Neutralising Value 16·0% (CaO), (Voluntary Declaration).
Found Neutralising Value 19·6% (CaO).

Table 30

Feeding Stuffs

Sample Number District and Description	Formal or In-formal	Per cent. Oil		Per cent. Protein		Per cent. Fibre		Other Figures per cent.
		G	F	G	F	G	F	
49/3/A Kirkham ... Pig Meal Rearer ...	F	3·0	2·3	16·0	14·2	4·0	3·7	A
50/3/A Kirkham Hi Energy Layers Mash	F	3·0	3·1	17·5	16·5	5·0	2·8	
8/4/A Blackburn Chick Starter Meal ...	F	2·75	2·4	20·0	21·1	4·5	3·4	
9/4/A Blackburn ... Pig Fattening Meal ...	F	2·25	2·05	13·0	14·3	5·5	4·8	B
35/10/A Seaforth Battery Intensive Layers Meal	F	3·5	2·9	17·0	16·4	3·5	3·3	
36/10/A Seaforth Sow and Weaner Meal...	F	2·5	2·8	17·0	16·0	4·5	4·3	
36/5/A Higher Blackburn Layers Mash	F	3·5	3·5	16·25	15·75	6·5	4·8	
37/5/A Higher Blackburn No. 2 Pig Meal	F	2·5	2·5	15·25	15·3	6·75	4·8	
9/9/A Manchester Pig Fattening Meal ...	F	2·5	1·8	14·0	14·7	5·0	3·8	C
10/9/A Manchester Top Lay Medium Hybrid Mash, A.V. ...	F	3·0	3·9	16·0	16·6	3·0	2·9	
48/7/A Bury Summer Dairy Mixture	F	5·0	5·1	14·5	14·1	8·5	8·4	
49/7/A Bury Standard Dairy Mixture	F	4·5	5·2	18·0	18·9	7·0	7·0	
1 Kirkham Intensive Layers Medium/Heavy Crosses	F	3·75	2·75	16·0	15·3	5·0	4·3	
2 Kirkham Sow and Weaner Pig Meal	F	2·5	3·1	16·0	15·2	6·0	4·4	
11/6/A Leyland Summer Dairy Nuts ...	F	2·65	3·2	15·15	15·6	7·0	6·9	
12/6/A Leyland Dairy Nuts	F	2·45	2·5	13·1	13·65	5·7	5·8	

Table 30—*continued*

Sample Number District and Description	Formal or In-formal	Per cent. Oil		Per cent. Protein		Per cent. Fibre		Other Figures per cent.
		G	F	G	F	G	F	
32/12/A Warrington Feeding Meat and Bone Meal	F	7·18	6·1	49·67	53·7			D
33/12/A Warrington Standard Broiler Finisher	F	3·0	2·35	17·5	18·4	3·0	1·9	
9/11/A Widnes Breeding Sow Chunks ...	F	3·0	2·25	15·5	15·2	4·5	4·3	
10/11/A Widnes Growers (a.v.) Meal/ Pellets	F	2·75	2·5	15·0	15·3	4·0	3·3	
11/4/A Lower Blackburn Sow and Weaner Meal	F	2·5	3·0	16·2	17·8	4·9	4·1	
12/4/A Lower Blackburn Pig Fattening Meal	F	4·0	3·8	14·5	14·4	7·0	4·6	
13/6/A Leyland No. 1 Pig Meal... ...	F	2·5	2·55	16·5	16·5	5·0	5·6	
14/6/A Leyland Poultry Feed Meal ...	F	3·0	3·25	16·5	14·7	6·0	4·5	
3 Kirkham Pig Weaner Feed ...	F	2·5	2·7	15·0	13·9	5·0	4·5	E
4 Kirkham Hen Battery Feed ...	F	2·5	3·0	16·0	16·15	6·0	4·1	
11/9/A Manchester ... Horse and Pony Pencils	F	3·0	3·1	15·0	14·5	7·0	6·6	
12/9/A Manchester Breeders Chips VA. ...	F	3·0	3·15	18·0	17·7	5·0	5·2	
20/2/A Lonsdale Cardinal Dairy Nuts ...	F	4·4	5·0	20·0	19·1	6·3	5·0	
21/2/A Lonsdale Cardinal Hybrid Mash	F	2·7	3·2	17·5	16·5	3·5	3·6	

G — Guaranteed.

F — Found.

A — Found Total Copper (as Cu) 110 parts per million.

B — Found Total Copper (as Cu) 120 parts per million.

C — Declared Total Copper (as Cu) 250 parts per million
Found Total Copper (as Cu) 80 parts per million.

D — Guaranteed Phosphoric Acid (P_2O_5) 13·4 %.
Found Phosphoric Acid (P_2O_5) 12·4%.
Found Salt (NaCl) 1·3 %.

E — Found Total Copper (as Cu) 90 parts per million.

PART IV.—WATERS, EFFLUENTS, ETC.

Potable Waters

Seventy-seven samples of potable water were examined in 1966, of which twenty-four were taken at dairies. Four were submitted only for an assessment of their lead content but the remaining seventy-three waters were submitted to a full analysis for suitability for drinking or domestic use. The results are classified in the following table according to source and organic purity.

Table 31

Waters 1966

Source	Fit	Doubtful	Unfit	Total
Deep Well	5	0	0	5
Shallow Well	1	0	1	2
Upland Surface	25	21	0	46
Upland Surface mixed with other waters ...	14	4	0	18
Miscellaneous	2	0	0	2
Totals ...	47	25	1	73

Fifty-five of the samples listed in the above table were taken from public supplies and two more were taken at pump-houses prior to use in public supplies. They comprised five deep well, 38 upland surface and 14 mixed waters from upland and other sources. Special consideration of bacteriological reports was recommended in connection with 20 of these but only because they contained faint traces of nitrites. Nitrites can be an indication of pollution but they often merely arise from the reduction of nitrates naturally present in the waters by the metalwork of the supply pipes. The remaining waters from public supplies were found to be of satisfactory quality.

Of the six other waters reported as being not wholly satisfactory, one was from a shallow well sunk in sand and was found to be contaminated, one was submitted in connection with a complaint that the supply was being affected by sheep dip, one was from another private supply with which there was associated a persistent history of stomach upset, and two were taken in connection with an investigation into the effects of tipping near the waters' gathering grounds. The remaining instance was a water taken from a hot water installation, and the

nitrites present may have been due to reduction of nitrates, although, of course, water from a hot water system should not be used for drinking purposes because of the risk of metallic and other contamination.

Twenty-six samples, including the four examined for lead content only, were taken because of, or in connection with, complaints. One was said to have caused sickness, and another, stomach upset. Eight were said to have abnormal odour or taste, although six of these seemed normal enough when examined in the laboratory ; algae were present in the remaining two and may, on earlier occasions, have been associated with at least two other of these taint complaints. Three samples resulted from sediment appearing in tapwater, and the one obtained from a hot water system turned blue in contact with soap. Sheep dipping near a hillside source of a private water supply gave rise to a complaint of contamination of the water supply with sheep dip ; in fact there was a minute amount of carbophenothion in the sample submitted. The householder had drawn a small bottleful of the water some days before the supply was sampled by the inspector, and the water in this small bottle contained not only carbophenothion but phenols as well. All the other complaint samples were submitted directly or indirectly because of tipping operations near gathering grounds for private water supplies, but in no instance was there any evidence of the tip drainage water having gained access to the drinking water.

Four of the samples of dairy waters, which are used for general dairy purposes, were taken from supplies other than public supplies, two being from a water lodge and two being mixed upland surface and spring waters. These were wholesome but all had high contents of free chlorine, one being as great as 11·9 parts per million. This was considered to be excessive, although it would have been unlikely to taint milk even if the water had been used for bottle rinsing. The highest amount of chlorine found at an ordinary consumer's tap in 1966 was 0·39 part per million. This sample had a very faint odour of chlorine but the taste appeared to be unaffected. All 73 waters were tested for free chlorine, and 43 contained small amounts, the mean quantity found in the tap waters which contained it being 0·06 part per million.

Five samples were examined for fluoride content, the natural amounts found ranging from 0·024 part per million to 0·044 part per million.

Twenty-five of the 77 samples were submitted by the County Medical Officer of Health and the others were submitted by the following Local Authorities :—City of Lancaster, 5 ; County Boroughs of Preston, 3 ; Southport, 4 ; Boroughs of Chorley, 4 ; Darwen, 9 ; Haslingden, 4 ; Leigh, 2 ; Morecambe and Heysham, 4 ; Urban Districts of Adlington, 2 ; Ramsbottom, 6 ; Standish-with-Langtree, 2 ; Thornton Cleveleys, 1 ; Tottington, 1 ; Ulverston, 1 ; Walton-le-Dale, 3 ; and Rural District of North Lonsdale, 1.

Toxic Metals in Water

All the potable waters submitted to the laboratory in 1966 were tested for lead, and 73 samples were tested for copper, zinc and iron.

Eight samples were found to contain lead, only one of these being from a public supply. This sample was originally submitted in connection with a complaint about sediment in the water, and it did in fact contain hydrated oxide of iron as well as 0·7 part per million of lead. When the lead was found, samples were immediately taken from the houses on either side of the address from which the original sample had been obtained, but these proved to be free from lead.

A high lead content in one of the suspect samples originally submitted in connection with an investigation into the effects of tipping near the gathering grounds, initiated a further investigation into the origin of the lead. A follow-up sample of the first water drawn in the morning from the same tap was found to contain 16 parts per million of lead. The supply was sampled again to determine the effect of running the water, but lead was still present at levels of 2·0 parts per million and 0·6 part per million — i.e. appreciably in excess of the recommended international maximum limit of 0·1 part per million for this metal in drinking water. Water from the storage tank which supplied this house was free from lead, so here again it became clear that the contamination was caused by the lead piping at the individual address. A slight excess of lead was found in another water which was taken in connection with tipping problems, an amount equal to the recommended limit was found in the sample contaminated with sheep dip, and lead was present in the water from the hot water supply. All the results are tabulated in Table 32.

Table 32

Lead parts per million	None	Less than than 0·1	0·1 to 0·3	0·31 to 1	More than 1
Number of samples	69	0	3	2	3

Traces of copper were found in 20 samples, but only in one case was the quantity present in excess of the recommended international maximum limit of 1·0 part per million. This was in the hot water supply sample which turned blue in contact with soap. The amount of copper causing this was five parts per million. The mean content of copper in the remaining waters in which it occurred was 0·05 part per million.

The usually accepted maximum limit for zinc in drinking water is five parts per million but none of the waters examined contained as much as this. Apart from the one sample from the hot water supply, which contained three parts per million of zinc in addition to the copper mentioned above, only four samples contained this metal. The largest amount found among these was 0·7 part per million.

Iron was found in all the samples tested for it. Amounts in excess of the limit of 0·3 part per million (above which it is generally considered that complaints of staining or turbidity may occur) were found in seven instances. Three of these were, in fact, submitted in connection with complaints. In the other cases the excess iron appeared to have caused no inconvenience. The iron results obtained are summarised in table 33.

Table 33

Iron parts per million	Less than 0·1	0·1 to 0·3	0·31 to 1	1·1 to 5
Number of samples	22	44	6	1

Aluminium hydroxide was found with the hydrated oxide of iron in one of the public supply waters about which a complaint of sediment had been made. The amount present was, however, only 0·14 per million

Other waters, Effluents, etc.

Forty-nine samples were submitted under this heading.

It is probably a tribute to the increasing activities of the Rivers Authorities that no actual effluents were analysed in the County Laboratory in 1966 and that analyses undertaken by the laboratory under the heading of " Other Waters " are tending to become rather time-consuming investigations into specific problems.

Waters from tips were involved in five such enquiries. Two were concerned with possible toxicity since they ran near the gathering grounds of a private water supply. Both were alkaline and contained fatty acids but they were not actually toxic, as was evident from the presence of living Paramoecia in both samples. Another sample associated with this enquiry seemed scarcely entitled to the description " water " for it consisted of about six per cent. of sump oil and two per cent. of insoluble material emulsified and suspended so that the sample appeared to consist of three layers of approximately equal volume. A miscellaneous sample number M.902, of P.V.C.—backed felts, was taken from the tip for separate examination, but the extracts from these

were not toxic, although appreciable amounts of lead were found in the mineral filler in one of them. The tip water was fairly acid in reaction and may have had battery acid in it, one effect of this being that all the lead present was safely " fixed " in the insoluble matter, which seemed to consist of clay, paint pigments and the minerals from the P.V.C. Since this water also contained a great deal of anionic detergent and copper, whereas the two alkaline waters mentioned above contained neither, it seemed evident that there had been no mingling. The remaining two samples connected with tip effluents were taken from brooks intended for land drainage. There was no definite contaminant which would conclusively identify the waters as having originated in the nearby tips but the general analyses were unusual and could only be matched by published figures for tip effluents. These analyses were as follows :—

Sample No.	**E 3744**	**E 3745**
pH Value	6·9	5·9
Total Solids	7380 parts per million	1820 parts per million
Free Ammonia	72 ,, ,, ,,	12 ,, ,, ,,
Albuminoid Ammonia	45 ,, ,, ,,	18 ,, ,, ,
Four Hour Permanganate Value	408 ,, ,, ,,	239 ,, ,, ,,
Biochemical Oxygen Demand	3900 ,, ,, ,,	2250 ,, ,, ,,
Chlorides	324 ,, ,, ,,	244 ,, ,, ,,

It will be seen that the ratio of Biochemical Oxygen Demand to Permanganate Value is about 10 : 1. A normal sewage effluent would give a ratio of only about 4 : 1.

Enquiries about oil contamination of a stream and contamination of street gullies revealed in the one case that paraffin and lubricating oil were involved and not paint oils as had been suspected, and in the other case Derv oil was found.

Questions of sewage contamination were involved in four separate cases, one from a stream (which proved to correspond to a " bad or polluted stream " and contained the anionic detergents which have almost become a chemical marker in domestic sewage), one from a dyke (which did contain sewage but owed its offensive nature more to anaerobic conditions in the mud present), one of subsoil water from a field drain (which was normal subsoil water), and one of seepage water (which did not appear to have been derived from domestic sewage).

Three river waters were analysed at different stages of the tide in order to help engineers concerned in the construction of a new sewage works to decide whether or not there was sea water in the river at the proposed effluent discharge point, and samples from a stream, above and below a motorway drain, were analysed to determine whether the water was fit for cattle to drink.

Building enquiries led to the examination of two ground waters for their possible effect on concrete. One of these had apparently entered a porous concrete duct despite its protective wrapping of bitumenised felt. No definite reason for such penetration was found on analysis, but the bacteria content of soil could be as high as 0·5 per cent. by weight, and it is known that part of this vast army of bacteria sometimes develops a taste for bitumenised felt.

A sea water was examined for its reserve alkalinity because, when used in a swimming bath, the baths manager felt that he was adding more alkali than should have been necessary. Finally, the chilling water from a pasteurising plant was analysed to determine the cause of offensive odours. The water was found to contain almost one per cent. of milk due to a leak in the heat exchange plates, which was subsequently detected.

Twenty-eight samples of water from swimming baths and a sea bathing lake were examined during the year, two of them being from school swimming baths. The Ministry of Health recommended in 1951 that the pH of swimming bath water should exceed seven but should not exceed eight and that total residual chlorine, where marginal chlorination is practised, should not be less than 0·2 part per million or be much greater than 0·5 part per million. Three waters were some what below this standard for chlorine although their general physical and chemical condition was good. Seven samples complied with the recommendations, but among these there were three samples concerning which it was advised that filtration and chlorination should continue each day after bathing had ceased in order to restore the water to its usual standard of chemical purity. The same advice was given in the case of another bath where although the total residual chlorine was high, most of it was in the form of chloramines.

Fifteen waters were from a single bath which uses breakpoint chlorination. This is a process which requires higher residuals of actual free chlorine in order to destroy organic matter as it arises in the water as well as for keeping it sterile. This process necessitates closer control than marginal chlorination, and the number of samples taken reflects this.

The total residual chlorine was high in both the school learner baths but, in order to keep the bacteriological condition of the water satisfactory at all times, operation of these shallow baths with higher chlorine margins together with adequate alkalinity is generally considered to be acceptable.

PART V.—RADIOACTIVITY

Radioactivity measurements, which were first started in September, 1958, have continued to be carried out each month of the year under review on samples of air, rainwater, tapwater and milk. Samples of school dinners and several other foods have also been tested for strontium 90. Altogether 95 samples were examined in the year 1966, these were made up as follows :—rainwater and deposits 12, air samples 41, shrimps 1, cabbage 1, cauliflower 1, baby food 3, and composite samples of milk 12, tapwater 16, flour 1, oatmeal 1 and school dinners 6.

Three atomic devices were exploded by China in May, October and December, 1966 and these each produced peaks of mainly short-lived fallout activity in this country about 20 days later. There were also several French tests in the period July to October but these took place in the Pacific and, therefore, did not cause appreciable air contamination in the Northern Hemisphere. These Chinese and French tests probably contributed less than two per cent. of the total strontium 90 deposited during 1966, the main portion being still derived from the intensive Russian and American tests in the years 1961 and 1962. Fallout from these tests was at a maximum during 1963 and has since progressively declined. The amounts of strontium 90 from all sources in air and rainwater samples during 1966 were only approximately two-fifths of those found for the previous year. The reduction in the concentration of this isotope in tapwater and milk was not as marked, the average concentrations in 1966 being 74 per cent. and 66 per cent. of the 1965 values respectively.

Radioactivity of Air Samples

Artificial radioactivity in the air was determined throughout the year by passing measured volumes through paper thimbles and determining the beta activity of the collected material after allowing sufficient time for the natural activity to decay. Strontium 90 was later determined on the combined deposits collected over each three month period. The results are recorded in table 34. It will be seen that the total beta activity was very low, there was a small increase in June and July due to seasonal effects plus the Chinese test of May 9th and a slightly higher peak in November from the Chinese test of the 27th October.

The average strontium 90 activity of the air samples for 1966 was 0·0027 picocuries per cubic metre which is 37 per cent. of the value found for the previous year. This should be compared with the limit of 3·0 units which is the recommended maximum permissible concentration of this isotope as applied to large populations.

Rainwater

An 18 inch square raingauge on the roof of the County Laboratory was used to collect samples of rainwater and associated deposits. These were examined each month for total beta activity and for strontium isotopes. The results are shown in table 35. The amount of strontium 90 collected in the year 1966 was equivalent to 1960 picocuries per square yard, this is 43 per cent. of the amount found in the previous year. The Chinese tests in May and October gave rise to some fallout in this region, mostly of short-lived isotopes. Strontium 89, an isotope with a half-life of 51 days appeared again and reached peak values in June and November from these two tests. From the known ratio of the strontium isotopes in fresh fission products it can be calculated that the 1966 tests were the source of less than two per cent. of the more dangerous strontium 90 activity recorded for the year.

Drinking Water

Mains tapwater from an upland surface gathering ground was also examined each month for total beta activity and the combined samples were examined each quarter for strontium 90. The results are recorded in table 36. The average beta activity for the year under review was 5·4 picocuries per litre of which 0·73 picocuries per litre was due to strontium 90. Both of these values are 74 per cent. of the amounts found for the previous year. The above figure for strontium 90 should be compared with the maximum permissible concentration for this isotope in drinking water which is 33 picocuries per litre.

Milk

Samples were examined regularly throughout the year because milk is known to be the principal food from which strontium 90 at present enters the diet of people in the United Kingdom and because it may form the sole diet of infants. The composite samples examined were obtained by taking an aliquot portion from each sample of heat-treated milk received in the laboratory for the regular bi-monthly testing of processing plants in the County area. The monthly turnover of these plants is approximately two million gallons and the composite samples obtained should be reasonably representative of the milk consumed in Lancashire. The results obtained for strontium 90 in the above-mentioned samples are shown in table 37. The average concentration of this isotope in milk for 1966 was 11·3 picocuries per gramme of calcium (*i.e.* 11·3 strontium units) and this is approximately 66 per cent. of the amount found in the previous year.

School Dinners

The results shown in table 38 are for composite samples from different schools each composed of dinners taken over five consecutive days. The average weight of a meal varied greatly and depended on the age of the children and the type of meal. Approximately two-thirds of the calcium in these dinners was probably due to the policy of using three-quarters of an ounce of separated milk powder per meal. The level of strontium 90 activity in the meals is, therefore, greatly influenced by its activity in milk at the time and place at which the milk powder was manufactured. The average strontium 90 in the 30 dinners examined was 18·7 picocuries per gramme of calcium compared with 23·1 units found in the year 1965.

Other Foodstuffs

The results for strontium 90 are listed in table 39. The two samples of baby food based on cereals were both of the same brand which had shown a raised value for a strontium 90 (41·6 strontium units) in November 1965. The samples purchased in February and December 1966 contained 34·7 and 24·5 strontium units respectively. This is a welcome reduction but the amount of strontium 90 is still higher than would be expected from the cereals and milk powder ingredients and is probably due to the use of bone phosphate as a calcium supplement. This type of product is, however, only used in small quantities each day and the strontium to calcium ratio will be reduced by the calcium in the associated milk diet. The other sample of baby food was a dried bone and vegetable mixture, but this contained only 7·6 strontium units since the bone ingredient was present as bone extract or stock and not as whole bone.

The cabbage and cauliflower samples bought in July contained 46·1 and 36·0 strontium units, these are unexpectedly high values. Cabbage tested in May the previous year had an activity of only 9·5 strontium units while values of 32·1 and 50·4 strontium units only were obtained in 1963 when the rate of fallout was very much greater than in the year under review.

The level of strontium 90 in the composite sample of oatmeal at 94·4 strontium units was slightly higher than that in the oatmeal tested in 1965 which gave 91·3 units. The strontium 90 level in the composite white flour sample fell from 8·5 units in 1965 to 7·6 units in the year under review. The results for white flour would have been six to seven times higher if the samples had not also contained the compulsory addition of chalk required by the Bread and Flour Regulations 1963; this addition made for nutritional purposes has the fortunate effect of reducing the strontium 90 to calcium ratio.

Interpretation of Results

The picocurie (the alternative name for micromicrocurie) is a measure of the activity of a radioactive isotope and is equivalent to that of one millionth of a millionth of a gramme of radium. In the case of Strontium 90, one picocurie means that, on average, 2·22 atoms are breaking down per minute to give, with its daughter product yttrium 90, 4·44 beta particles per minute. Calcium and strontium are transferred from the diet to the bone in a relatively constant ratio, calcium therefore, depresses the absorption of strontium by the skeleton. The amount of strontium deposited in the bone is determined by the ratio of strontium to calcium in the total diet and not by its content of strontium alone. In comparing diets or the effects of different foods, therefor, it is the strontium 90 to calcium ratio which is of importance; this ratio is conventionally expressed in terms of strontium units (S.U.'s), where one strontium unit is equal to one picocurie of strontium 90 per gramme of calcium.

Fallout material contains a large number of radioactive isotopes, but only a few are absorbed from the diet and retained in the body. Of these isotopes strontium 90 has been singled out for attention because of its long half-life of 28 years and because it is concentrated in the bone where it is retained with an effective half-life of 7½ years. Bone and bone marrow are also the body tissues which receive the highest total radiation dose from the various components of fallout and strontium 90 is the main contributor to this dose.

From the results obtained in 1966 it can be estimated that the average adult diet over the year would have a strontium 90 to calcium ratio of approximately 12 strontium units as against 16 S.U.'s estimated for 1965. The body discriminates to some extent against strontium so that this element is absorbed at only about one quarter of the rate for calcium. Thus a level of 12 strontium units in the diet will lead to three strontium units in growing bone and this would give rise to a dose rate to this tissue of eight millirems per year. These figures should be compared with the limit of 67 strontium units recommended as the maximum permissible body burden appropriate for large populations by the International Commission for Radiological Protection and with the average dose rate from natural radiation to bone which has been estimated at about 130 millirems per year.

Table 34

Radioactivity of Air Samples

Sampling Period	Approximate Average Total Beta Activity	Strontium 90
1966	Picocuries per cubic metre	Picocuries per cubic metre
Jan.	0·012	
Feb.	0·012	0·0028
March	0·015	
April	0·015	
May	0·010	0·0044
June	0·029	
July	0·022	
Aug.	0·006	0·0024
Sept.	0·007	
Oct.	0·000	
Nov.	0·053	0·0013 (Sr 89 = 0·005)
Dec.	0·008	
Average for year	0·016	0·0027

Table 35

Radioactivity of Rainwater and Deposit

Activity deposited per square yard

Month	Rainfall	Volume of Rain	Beta Activity of acid soluble matter	Strontium 89	Strontium 90
1966	Inches	Litres	Picocuries (1)	Picocuries	Picocuries
Jan.	2·60	55·4	750	—	140
Feb.	4·16	88·5	2,180	—	204
March	2·95	62·6	3,280	—	304
April	2·72	57·8	2,440	—	180
May	3·67	78·0	2,610	—	232
June	4·91	104·5	4,870	490	272
July	1·77	37·7	1,480	240	136
Aug.	3·74	79·7	1,710	160	120
Sept.	3·88	82·6	1,280	70	80
Oct.	5·62	119·6	1,450	50	112
Nov.	3·31	70·5	3,680	1,300	76
Dec.	5·24	111·5	1,420	180	104
Totals ...	44·57	948·4	—	—	1,960

(1) Activity as measured at the end of each month in a liquid counter standardised with Sr90 - Y90 and no correction for decay.

Table 36

Radioactivity of Mains Tap Water

(Upland Surface Gathering Ground)

Month	Total Beta Activity (1)	Strontium 90
1966	Picocuries per litre (2)	Picocuries per litre
January	4·2	
February	3·6	0·84
March	2·2	
April	3·0	
May	9·3	0·77
June	7·4	
July	8·9	
August	8·9	0·66
September	5·9	
October	3·5	
November	4·5	0·65
December	3·9	
Average	5·4	0·73

(1) The natural potassium present has an activity of approximately 0·4 picocuries per litre.

(2) As measured in a liquid counter standardised with a strontium 90—Yttrium 90 standard solution.

Table 37

Strontium 90 in Milk

Month	Number of Milks Sampled	Strontium 90	
1966		Picocuries per kilo	Picocuries per gramme of calcium
January	151	17·5	16·3
February	119	15·5	13·5
March	108	16·8	14·5
April	142	17·8	14·3
May	108	13·6	11·7
June	104	12·5	11·2
July	120	12·4	11·0*
August	106	11·5	10·0*
September	116	10·0	8·6
October	157	9·0	7·7
November	132	9·1	7·9
December	114	10·0	8·7
Averages		13·0	11·3

*Sr 89 was present in July and August equivalent to 5 and 4 picocuries per gramme of calcium respectively.

Table 38

Strontium 90 in School Dinners

Date 1966	Average Weight of Meal	Average Calcium		Average Strontium 90	
Five consecutive School Days beginning	Grammes	per cent.	Grammes per day	Picocuries per day	Picocuries per gramme Calcium
14th February	381	0·092	0·349	8·8	25·3
22nd April ...	490	0·097	0·475	7·6	16·1
10th June ...	664	0·082	0·543	8·0	14·7
12th September	353	0·077	0·273	7·7	28·4
10th October ...	473	0·092	0·435	7·1	16·3
6th December ...	655	0·071	0·465	8·2	17·6
Averages ...	503	0·084	0·423	7·9	18·7

Table 39

Strontium 90 in Some Other Foods 1966

Lab. No.	Sample	Date Purchased	Calcium per cent.	Strontium 90	
				Picocuries per kilo	Picocuries per gramme Calcium
R.773	Baby Cereal	2nd Feb.	0·81	281	34·7
R.774	Baby Food (bone and vegetable)	2nd Feb.	0·52	39	7·6
R.843	Baby Cereal	5th Dec.	0·88	216	24·5
R.805	Cabbage	11th July	0·097	44·8	46·1
R.806	Cauliflower	11th July	0·024	8·6	36·0
R.848	White Flour (28 samples)	2nd & 4th quarters	0·137	10·4	7·6 (Approximately 47·0 on the natural calcium)
R.849	Oatmeal (8 samples)	4th quarter	0·066	62·8	94·4

PART VI.—MISCELLANEOUS SAMPLES

This section of the report includes those samples which, because of their nature or because of the circumstances under which they were obtained, could not be included in previous sections of the report. Two hundred and forty-seven samples were examined under this heading and they were submitted as follows :—County Medical Officer of Health, 16 ; County Architect, 7 ; County Treasurer, 1 ; Chief Officer County Fire Brigade, 2 ; County Borough of Preston, 7 ; County Borough of Southport, 12 ; City of Lancaster, 28 ; Borough of Darwen, 2 ; Borough of Fleetwood, 2 ; Borough of Leigh, 35 ; Borough of Middleton, 1 ; Borough of Morecambe and Heysham, 1 ; Borough of Radcliffe, 2 ; Urban District of Formby, 11 ; Urban District of Kirkby, 1 ; Urban District of Ramsbottom, 1 ; Urban District of Walton-le-Dale, 12 ; Rural District of Lancaster, 1 ; Port of Preston Authority, 1 ; 104 samples were also examined for the information of the Laboratory. The work carried out on some of the more interesting of these samples is discussed briefly in the following paragraphs.

Atmospheric Pollution

During the year 1966, 103 deposits and rainwater from soot gauges were analysed on behalf of the County Borough of Preston, the County Borough of Southport, the City of Lancaster, the Borough of Leigh and the Urban Districts of Formby and Walton-le-Dale. In addition, four lead dioxide candles were analysed for the County Borough of Preston.

The standard soot deposit gauge consists of a large glass funnel of known area leading into a bottle large enough to hold a month's rainwater. The soot and rainwater collected are brought into the laboratory at the end of each month for analysis, the minimum number of determinations carried out being those listed in Table 40. The sulphur candles are porcelain cylinders of known area which are covered with a layer of lead dioxide prepared under standard conditions. This surface, on exposure at the site, reacts chemically with sulphur gases present in the surrounding atmosphere and when it is examined at the end of the month its sulphate content is proportional to the average concentration of corrosive sulphur gases in the air at that point for the whole of the month.

To illustrate the nature and magnitude of the results obtained in the examination of the contents of soot gauges the average monthly figures for the three sites in the Borough of Leigh for the year 1966 are set out in Table 40. The Manchester Road and Firs Maternity Home sites are approximately one mile to the East and West of the central Town Hall site respectively. The results recorded in the table show little change from those found over recent years.

Table 40

Soot Gauge Observations, 1966
Monthly Averages in Tons per square mile

Site	Borough of Leigh					
	Manchester Road		Town Hall		Firs Maternity Home	
Rainfall in inches ...	2·77		3·17		3·27	
Carbonaceous matter and Tar	2·64	7·44*	5·58	18·00*	3·15	7·63*
Ash	4·80		12·42		4·48	
Soluble Deposit	5·57		7·38		5·38	
Total Deposit	13·01		25·38		13·01	
pH	3·8		3·9		3·8	

*Insoluble Deposit.

The following miscellaneous samples may also prove of interest :—

Milk Bottle, Sample No. M.720.

This pint milk bottle was submitted as the result of a complaint. When received at the laboratory the bottle was practically empty except that it was found to contain 3·97 grammes of broken glass and traces of liquid milk. The bottle itself was not damaged in any way. The broken glass consisted of 18 small pieces and a little powdered glass. Five of the pieces could be fitted together and they then resembled curved parts of the rim of the neck of the milk bottle. The broken glass had a density of 2·490 which was almost identical with that of the glass of the bottle itself ; this and the curvature, etc., of the broken pieces of glass indicated that they had probably originally formed part of a similar bottle. Legal proceedings were instituted under Sections 2 and 113 (3) of the Food and Drugs Act, against the dairy company who had bottled the milk and at the hearing of the case the firm concerned pleaded " guilty " and was fined £5 0s. 0d. together with £7 17s. 6d. costs.

Foreign Matter from a Spice Bun, Sample No. M.768.

This consisted of a brown object weighing 0·11 gramme and measuring approximately $\frac{1}{4}$ inch by $\frac{5}{16}$ inch. It was broken at one end exposing a small cavity and it had a faint spicy odour. Upon microscopical examination it was found to be part of the shell of an unidentified fruit or seed and it had probably been introduced into the bun with the spices.

Foreign Matter in Can of Pears, Sample No. M.793.

This sample consisted of part of an opened can of pears which was found to contain a large cream and green coloured mass (8 cms. in diameter and 4 mm. in thickness). This upon microscopical examination, and after culture, was found to consist of a mat of live fungus of the nature of Penicillium chrysogenum. A careful examination of the can showed that there was a very small perforation in the bottom of the can near the centre and this was undoubtedly responsible for the condition of the contents of the can. The above findings in connection with this complaint were brought to the attention of the importers of the canned pears and they, in turn, brought the matter to the attention of the foreign canners.

Part of a Meal, Sample No. M.801.

This object, which had been recovered from the throat of the complainant, measured 15 millimetres in length and was found upon examination to consist of part of a toe ,with claw attached, from a bird. Upon chemical and physical examination it was found that it had been cooked. The claw was not worn down at all, and this together with the size and general appearance of the part toe indicated that it had probably been derived from a chicken intensively reared for food purposes and killed at the age of about one month. It transpired that it had been present in a meal of curried chicken and rice served in a restaurant. The premises concerned were inspected and the proprietor interviewed and cautioned with regard to the complaint.

Adhesive Dressing, Sample No. M.855.

This complaint sample was alleged to have been in a can of stewed steak. Upon examination it was found to consist of a used flesh-coloured perforated plastic adhesive wound dressing measuring approximately 73 millimetres by 18 millimetres with an attached fabric pad measuring 23 millimetres by 15 millimetres. Both the plastic dressing and the fabric pad were soiled and bore traces of dry red-brown material which upon microscopical examination was found to consist of dried particles of meat with some wheat starch. In addition, on the fabric pad there were traces of lighter coloured staining from which were obtained a few apparently unheated red-blood cells and some cells similar to cornified epithelium from the skin. The stains on the fabric pad yielded a positive peroxidase test but the fragments of meat yielded a negative result by this test. The above findings therefore indicate that the plastic dressing had been in contact with the canned meat but that this had probably occurred after the can had been opened.

Fibre Sample, No. M.890.

This sample consisted of a tuft of straw coloured fibres measuring approximately 50 millimetres in length which were alleged to be hair from a steak pudding which had formed part of a meal. Upon microscopical examination the fibres were found to be vegetable in origin and they had the characteristics of jute fibres. Furthermore, although traces of both cooked potato and pea or bean were found adhering to them there was no evidence of the presence of any particles of meat. Nothing, therefore, was found which would link the fibres with the steak pudding as distinct from the other ingredients of the meal and the complainant and the cafe proprietor were both informed of the above findings, the latter was also cautioned.

Mouse Dropping, Sample No. M.895.

This specimen was submitted by an autonomous Food and Drugs Authority for comparison with similar foreign matter found loose on the top of a steak pie (Sample No. 140) submitted, as the result of complaint, by the same authority. Sample No. M.895 was found on the premises of the fish and chip shop from which the pie had been sold. It was possible to show by chemical examination that the mouse dropping found on the top of the steak pie had not been baked with the pie and by microscopical examination that both mouse droppings contained wheat (flour) debris and pea or bean cellular matter. It is unlikely that peas would be present in a bakery but they are frequently sold in fish and chip shops. Legal proceedings were instituted by the authority concerned under Section 2 of the Food and Drugs Act against the two proprietors of the fish and chip shop in respect of sample No. 140. At the hearing they pleaded " guilty " and were each fined £5 0s. 0d. and 31/6 costs. (£13 3s. 0d. in all).

Flour Confectionery, Sample No. M.841.

This sample consisted of a cellophane wrapped chocolate coloured roll with a sweetened " cream " filling which had been obtained from a retail confectioners from which a complaint sample (No. C.2713) of a swiss roll had originally been purchased. The cellophane wrapper of sample No. C.2713 had previously been opened and some of the swiss roll removed but when submitted to the laboratory the sample contained 26 dead black ants, most of which were between the wrapper and the roll but eight were inside the ends of the folds of the roll. Sample No. M.841 was also found to contain three dead ants although the cellophane wrapper did not appear to have previously been opened but it would have been possible for ants to get inside the folds of the wrapper. In respect of both samples it was stated that some of the ants were

alive when the samples were first obtained. Investigations were carried out on the premises of the retail confectioners, the wholesalers and the bakery but no further evidence was found of an infestation of ants. Under these circumstances it was decided to caution the retailer and not to institute legal proceedings.

Sludge, Sample No. M.712.

This sample was submitted by the Chief Public Health Inspector of a County District and it consisted of dark brown (almost black) material which had been illegally tipped into a quarry. In view of the fact that the quarry was on the gathering ground of a number of private water supplies concern was expressed as to the possibility of contamination of the water. Upon examination it was found that the sludge contained 15·6 per cent. of caustic soda, 3·6 per cent. of sodium carbonate and cellular matter derived from cotton, indicating, as suspected, that it was the concentrated waste from keirs in a bleaching and dying works. Two samples of water (Nos. W.3312 and W.3313) from the gathering ground in question were both found to be free from contamination with the sludge. This sample is of interest in that later in the year a neighbouring County District submitted samples of liquid waste from a tip (sample No. E.3779), two samples of neighbouring stream water (Nos. E.3777 and E.3778) and two samples of private supply drinking water (Nos. W.3374 and W.3375) because it was suspected that alkaline bleach works waste had been tipped in the neighbourhood. Both stream waters were alkaline in reaction, showed high sodium carbonate alkalinity and the presence of soaps. The liquid waste from the tip was very complex in character ; it contained sump oil, paint residues, a relatively large amount of sodium sulphate and some cotton cellular matter. There was, therefore, evidence that alkaline waste, probably from a bleach works, had gained access to both the tip and the two streams but in this instance also no evidence was found of contamination of the two private supplies of drinking water.

Other samples which may be mentioned included ; two samples of air (Nos. M.735 and M.736) from a house in a County District for carbon monoxide determination, but this gas was found to be absent. Three wire staples (sample No. M.786) were submitted by an autonomous Food and Drgus Authority for comparison in connection with the presence of wire staples in an apple purchased from a shop ; no significant difference was found in the chemical composition or the appearance of any of the staples. The same autonomous Food and Drugs Authority submitted samples of wheat (Nos. M.828 and M.829) in order to determine the amounts of Alpha-chloralose present. The wheat was being used in connection with pest control on factory premises. Another autonomous authority submitted a sample of liquid factory waste

(No. M.831) which contained synthetic detergent, soap and wax in order to ascertain whether it would constitute a hazard if accepted on the municipal tip. The Chief Public Health Inspector of a County District submitted a sample of canned Melon (No. M.844) which was found to contain 440 parts per million of tin (the recommended maximum limit for tin in canned foods is 250 parts per million). Following reports in the press of lead in the coating of some frying pans a " non-stick " frying pan (sample No. M.876) was submitted for examination by an autonomous authority but both the metal and the plastic lining of the frying pan were found to be free from lead. Two samples of dried paint films (Nos. M.897 and M.898) from fittings in a house were submitted by the Chief Public Health Inspector of a County District in connection with a case of lead poisoning. Both samples were found to contain amounts of lead slightly in excess of the limit of 1·1 per cent. prescribed by British Standard 3443 : 1961 "the Code of Safety Requirements for Children's Toy and Playthings." A sample of dust or foreign matter (No. M.904) found on a cargo of wood pulp was submitted by a Port Authority ; the foreign matter was found to be iron pyrites.

In connection with the co-ordinated purchasing scheme and the placing of contracts, three samples of rose hip syrup were examined for the County Medical Officer of Health. Two samples of anti-freeze solutions for use in the cooling systems of motor vehicles were examined for the County Chief Fire Officer in order to ascertain whether they conformed to the requirements of British Standard Specification 3151 : 1959 for Type B Anti-Freeze (Sodium Benzoate and Sodium Nitrite Inhibited). A metal fitting from a cupboard was examined for the County Architect in order to ascertain whether it complied with the specification for the metal and a sample of solder was examined for composition and melting point. Two samples of earth, two of felt, one of cellular concrete and one of subsoil ground water were also examined for the County Architect in connection with the corrosion of underground service pipes. Finally, a sample of dust from one of the air filters of a computer was examined for the County Treasurer.